

Wilson Boy

PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

BUREAU OF STANDARDS

AUGUST, 1928

NOV 22 1928

LIBRARY



When there appears to be no solution--
make use of Bakelite Service

WHEN the part required is exceptionally intricate in form; when unusual strength, or heat resistance, or electrical properties are required; when there is a doubt as to the best design for a mold—when these or any other problems confront you, we shall be glad to have you draw upon the many years of experience of Bakelite Engineers, and the facilities of Bakelite Laboratories.

A molder of an automotive ignition part required a material of exceptional strength—Bakelite Laboratories developed and furnished it.

Another firm required a material to be used for molding "paper-thin" telephone diaphragms and Bakelite Laboratories provided it.

Bakelite Engineers often work with the molder and die maker, in designing unusual molds which will be both practical and economical. These are but a few of the hundreds of ways in which Bakelite Engineers and Laboratories are cooperating with the plastic molding trades. We always welcome opportunities to be of service.

BAKELITE CORPORATION

247 Park Avenue, New York, N. Y. Chicago Office: 635 West 22nd Street
BAKELITE CORPORATION OF CANADA, LTD., 163 Dufferin St., Toronto, Can.

BAKELITE

REGISTERED

U. S. PAT. OFF.



THE MATERIAL OF A THOUSAND USES

"The registered Trade Mark and Symbol shown above may be used only on products made from materials manufactured by Bakelite Corporation. Under the capital 'B' is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products."

Molded Products

See Page 455



KAROLITH

C O L O R

Karolith will help you to meet the demand for color in the home.

MOLDING SERVICE

Parts molded in special forms to your specifications, in all colors. Send us your blue-prints, specifications, or samples for estimate of cost.

Molded Karolith parts are a new innovation
in the Molding Art.

Karolith is regularly supplied to manufacturers in the form of rods, sheets and tubes, and molded parts in all colors. Non-inflammable, non-conductive, odorless, fadeless, tasteless.

Write us for information,
stating your requirements.

KAROLITH

C O R P O R A T I O N

2125-2129-44th Road

Long Island City, N. Y.

Where the race of competition is keen, *Durez helps to get there first*



IN THE close competition of the radio field Durez offers truly remarkable production economies which no manufacturer can afford to overlook.

The Mack Molding Company; Little Falls, New Jersey, can bear witness to that truth. They make charger covers and other radio parts with Durez.

Durez parts come from the mold in finished form. One single operation—that's all. No tooling. No buffing or polishing. No costly finishing work. Durez molds quickly and faithfully into the most intricate design. It comes out hard as flint and with the lustre of burnished ebony. And—a tool has not touched it!

The quick fusing and hardening properties of Durez assure rapid and economic production. It has high mechanical and dielectric strength. It is ideally suited to the manufacture not only of radio parts, but of products in countless other lines. Indeed, many manufacturers tell us that Durez is the most satisfactory molding compound they have ever used.

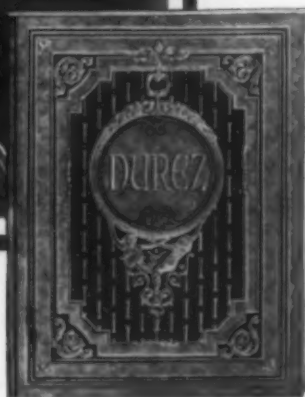
Let us aid you in determining the most desirable application of Durez in your manufacturing processes. Our laboratory and the services of our engineers are at your disposal at all times.

General Plastics, Incorporated, 71 Walck Road, North Tonawanda, N. Y. Also New York City, Chicago, San Francisco.

DUREZ

*Send for free copy
of this
interesting booklet,
"Do it with Durez"*

It tells the complete story of this wonderful plastic. Shows how it may be economically adapted to meet the most exacting needs; and the beautiful color effects (plain, mottled or striated) which may be attained. Profusely illustrated in full colors.



Aladdinite

1st

in United States



Aladdinite was the first casein plastic to be manufactured in this country.

In Aladdinite you have a strong, durable, workable material that is **INEXPENSIVE, NON-INFLAMMABLE and SANITARY.**

It machines easily because it is made from the finest quality of imported casein.

The uses of Aladdinite are unlimited, particularly being applied in the button industry, in radio, for novelties, fountain pens, pencils, cigarette holders, beads and combs.

Aladdinite is superior to hard rubber, wood, ivory, or any expensive and dangerous materials for both economic and safety reasons.

Aladdinite comes in sheets and rods—in all colors, either solid or mottled, and such pretty effects as buffalo horn and tortoise shell. It takes a beautiful finish readily.

If you are interested in component parts made from Aladdinite, we shall gladly refer you to reputable manufacturers fabricating it.

Insist on Aladdinite, the original American material.

Aladdinite Co., Inc.

ORANGE, N. J.

Established 1919

PLANTS AT ARLINGTON, NEW JERSEY AND LEOMINSTER, MASS.



To Increase Your Ability to Meet the Needs of Your Market

Are You Making Full Use of Color?

THE successful manufacturer today must be increasingly ingenious. He must not only continually reduce production costs, but he must always be ready to improve and alter his product to meet the ever-changing requirements of style.

Today, more than any other one factor, the plastic manufacturer must consider **color** as a selling force. Consider what du Pont Pyralin can do for you on this score alone.

The colored and variegated effects you can get with beautiful Pyralin are almost limitless. Du Pont Pyralin sheets, rods and tubes are always available in a multitude of deep, rich colors and in pastel

tints. They are made transparent—clear or tinted; opaque—mottled, striped, checked; they come in pearl, amber, tortoise-shell and in a variety of other unusual and striking designs. This easily-worked, durable plastic offers you an economical way to put new attractiveness into your product and materially increase its "saleability."

Du Pont industrial engineers and the immense facilities for research and experimentation they command are often able to help manufacturers develop new methods of production which expand markets and increase profits. This service cannot be purchased. Make use of it freely in your organization.

The ever-changing needs of the plastics manufacturer are met unfailingly by du Pont Pyralin. Exact production methods and tested seasoning produce Pyralin Sheetting, Rods and Tubes of thorough reliability.



PYRALIN

Sheets Rods Tubes

DU PONT VISCOLOID COMPANY, INC., 330 FIFTH AVENUE, NEW YORK CITY

BURROUGHS

BURROUGHS

BURROUGHS

BURROUGHS

A NAME of authority in methods
and equipment for working
Thermo Plastic Materials.



An Analysis of the Technique of Moulding Thermo Plastic Materials

75%--Burroughs Equipment
15%--Proper Material
10%--Common Sense

100%



The Burroughs Company

Established 1869

248 NORTH TENTH STREET

NEWARK, N. J.

BUILDERS OF HYDRAULIC MACHINERY FOR ALL PURPOSES

BURROUGHS

BURROUGHS

BURROUGHS



THIS issue of **PLASTICS** has come from the office of the new publisher. **Plastics Publications, Inc.**, its owners, have new plans and ambitions for a more balanced paper; and a more interesting and serviceable one. But they must come gradually, and consequently it will not be until Fall that a definite program can appear. It will be evident with each issue, however, that certain new plans have been launched. We urge our readers to look for these possible additions, and to comment upon them, setting forth their own views, and adding any suggestions from their own needs.

It is evident to the publisher that there is a much closer relationship between manufacturers than there has formerly been. Not only are the executives meeting each other more than ever to discuss problems in the solution of which lie mutual benefits, but even the technicians and chemists are analyzing the strength and weakness of other materials, and attempting to discuss their points sanely. It is a surprise indeed, but it is a situation that cannot be too highly commended. Certainly it is sincerely hoped that **Plastics** has in some way helped to make this change through its close relationship to the entire field. Merchandizing problems are now ahead; problems that heretofore have been unsolved. How much more benefit can be derived if some of these are entrusted to other hands,—thrust into an open criticism and analysis! **Plastics** offers its pages.

We take this opportunity to extend to our advertisers a cordial and deep appreciation of their services. Without them this paper would have suffered—as well as the publisher—and only through their co-operation can the new problems in this infant industry, already so lusty and thriving, be set forth for their relief.

THE PUBLISHER

PLASTICS

& MOLDED PRODUCTS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 4

AUGUST, 1928

No. 8

Contents

Dioxy-Diphenyl-Dimethyl-Methane, By Charles W. Rivise	429
Developed by W. A. Beatty, the process employed covers as wide a range as the production of artificial silk and the making of a substitute for windshields.	
The Physical Properties of the Cellulose Plastics, By O. Manfred and J. Obrist	431
How their origin and the processes of manufacture affect their elasticity and strength.	
The Patent History of Composite Gears, By Joseph Rossman	433
The course of development during the past three years as shown by the patents.	
Colorless Glycerol Resin	438
The World Trade in Plastics, By C. C. Concannon	440
The Baltic Countries, Norway, Latvia, Lithuania and Esthonia, Dutch East Indies.	
Molding Sound Records in Presses Under Hot Water	441
Molding Porous Plastic Articles	441
Research Activities in the Rubber Plastics, By Carl Marx	442
Rubber Chemists are contributing many new and useful products that mold quickly and cleanly.	
Byron B. Goldsmith—A Pioneer in Casein Plastics	444
From 1898 to within recent years, this investigator was working on the problem of casein plastification.	
Technical Abstracts	446
New DuPont Toiletware Line	446

MOLDED PRODUCTS—See Page 455

Molded Gasoline Gauge	455
Scranton Button Company molds measuring device requiring accuracy and simplicity.	
Too Much Color?	457
What is the effect of increasing variety of color in molding in the manufacture and distribution of the products.	
Molding Casein, By Nicholas Klein, Ch. E.	460
Developments in the molding of finished articles of casein.	
Molded Equipment in the Antarctic	460
A New Departure in Molded Electric Plug Connectors	462
Big Developments in British Phonograph Industry, By A. C. Blackall	464
Color in Electric Wall Plates	472

Carl Marx, B. Ch., Editor
 Wm. Gruen, E. E., A. M., Editor MOLDED PRODUCTS
 J. A. Maguire, Associate Editor
 V. C. Rockhill, Consulting Editor
 A. C. Blackall, British Correspondent
 Heinrich Prehn, German Correspondent
 Publication Office: Washington, N. J.
 Offices: 114 E. 32nd St., New York.
 R. C. Gilmore Jr., Publisher
 D. D. Sheriffs, Chicago Representative
 80 E. Jackson Blvd.
 Subscription Price—U. S. \$3.00, Foreign \$4.00 Per Year
 Issued Monthly—35 cents a copy
 Copyright, 1928

Erinoid

A superior
casein product
for

WITH ERINOID the manufacturer of electrical specialties and novelties can solve problems that are answerable with no other material.

ERINOID is non-inflammable, of high dielectric strength and non-corrosive. It is supplied in a very large number of beautiful colors and tint combinations. Pure ivory, many natural wood grains, shell, marble, and stone textures are faithfully reproduced.

ERINOID is furnished in sheets, rods and tubes and will permit of easy, fast "working" such as shaping, milling, drilling, etc. Write for samples and prices.

Switch
and
Receptacle
Plates

Switch-
board
Keys

Radio
Parts

Decorative
Electrical
Fittings

Bell Buttons

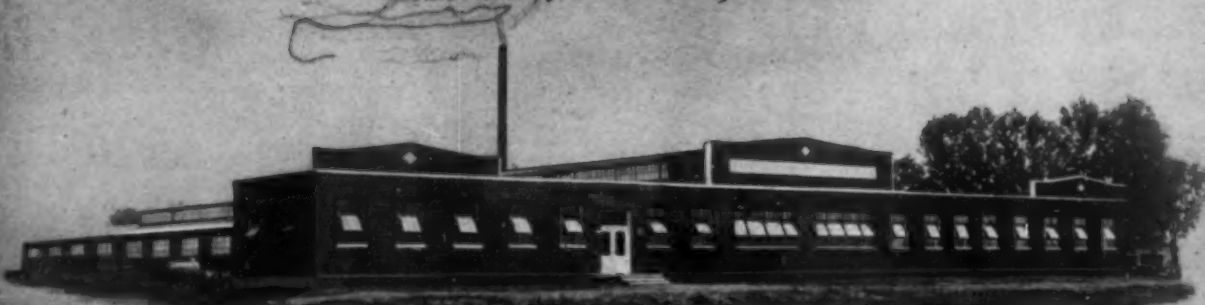
Bushings

Plugs

THE ERINOID COMPANY OF AMERICA

15 PARK ROW NEW YORK, N.Y.

Factory: Bainbridge, N.Y.



PLASTICS

A periodical devoted to the manufacture
and use of plastic and composition products

Vol. 4

AUGUST 1928

No. 8

Dioxy-diphenyl-Dimethyl-Methane and Its Utility in the Production of Plastics

Developed by W. A. Beatty, the processes employed
cover as wide a range as the production of artificial
silk and the making of a substitute for windshields

By Charles W. Rivise

LL.B., B. S., in Chem. Eng., M. P. L.

IN the entire patent literature on the subject of synthetic resins, numbering close to 1500 patents, there is probably no substance for which is claimed so great a versatility in properties and so wide and diverse a range of applications and uses as dioxy-diphenyl-dimethyl-methane. This material, its derivatives and their suggested applications form the subject matter of eleven patents issued to W. A. Beatty. The industrial applications disclosed in these patents vary from artificial silks to an indelible ink for linens and cover such non-analogous uses as glass substitutes for wind shields, moving picture films, phonograph records, insulation, roofing and paint for radiators.

Method of Making Dioxy Compound

To make dioxy-diphenyl-dimethyl-methane, phenol, acetone and a mineral acid catalyst, such as hydrochloric or sulphuric acid are allowed to stand from 30 degrees to 40 degrees C. until the entire mass becomes solid. The product is washed with dilute

The chemical compound under discussion, by reason of its inherent complex structure, is particularly applicable to condensation and polymerization—so that it practically constitutes a sort of building block from which other substances can be built up.

acetic acid and, if necessary, recrystallized from hot water or dilute acetic acid and dried in order to get rid of the impurities such as carbolic acid. The product is said to be decidedly crystalline, colorless, odorless and soluble in alcohol, acetic acid, and ethyl acetate as well as in other organic solvents.

Applications of the Dioxy Compound

The dioxy compound made as above may be mixed with cellulose acetate or nitro-cellulose, dissolved in acetone and squirted through capillary orifices into a benzene bath to obtain filaments of an artificial silk. The

filaments may be woven into fabrics as is usual in the rayon art. The fabric thus made may be stiffened and rendered water-proof by coating or impregnating with more of the mixture to adapt it for use as tent cloth. A variation is to impregnate yarns or threads of silk, cotton or linen with the mixture and weave them into suitable fabrics.

Leatheroid or artificial leather may be made by coating or impregnating ordinary fabrics in order to render fabrics fire-proof they may be loaded with alum or cellulose acetate. Patent leather may be made in the usual manner, using the mixture. Leather impregnated with the mixture may be used to make soles or insoles.

An application of this mixture which is rather unobvious and far removed from its use in artificial silks, is its use in making malleable glass suitable for automobile shields, window panes and lanterns. Reinforced with wire, this glass substitute may further be used for the roofs of vaults and hot houses.

The glass-like sheets may be colored by dyes and made into articles that are usually made of celluloid, pyroxylin, tortoise shell, ivory, or horn, such as buttons and combs. When used as a celluloid substitute, various fillers as well as camphor or camphor substitutes may be incorporated into the mixture.

In addition to the uses outlined above, the mixture may be made into articles that are usually made of hard rubber. If the hard rubber substitute is to be of a dark color, lamp black, or other coloring material may be incorporated.

The mixture is also said to be especially suitable for insulation in general, for coating the outside of silk powder bags and for fixing the bristles of brushes to their holders.

The above subject matter is contained in Patent No. 1,156,969 dated October 19, 1915. The claims, however, cover merely the artificial silk filament and the fabric made therefrom.

Combined With Cellulose Esters

In Patent No. 1,158,960 dated November 2, 1915 the inventor dissolves the mixture of dioxy compound and cellulose acetate in a common solvent such as alcohol or chloroform and uses the resulting plastic composition as a celluloid substitute.

In Patent No. 1,158,961 the inventor dissolves a mixture of dioxy compound and a cellulose ester such as nitrocellulose in amyl acetate and acetone, and evaporates the solution to the desired consistency. The product is said to be suitable for the making of moving picture films.

The dioxy compound in the mixture may be partially replaced by camphor or the so-called camphor substitutes such as acetanilide, triphenyl phosphate and alkyl derivatives of benzene-sulpho-amides according to Patent No. 1,188,356 dated June 20, 1916.

Patent No. 1,158,963 is specific to a moving picture film made of a mixture of the dioxy com-

pound and a cellulose ester such as cellulose acetate. The film may be coated with a condensation product of the dioxy compound and an aldehyde such as formaldehyde before applying the photo-sensitive emulsion thereto.

In Patent No. 1,158,964 the dioxy compound and tri-nitro-cellulose are dissolved together in a common solvent such as acetone and molded with or without fillers into a phonograph record blank.

Condensation Product of Dioxy-Diphenyl-Dimethyl-Methane

In Patent No. 1,225,748 the inventor takes us a step further and condenses the dioxy compound with an aldehyde to produce a resin that apparently has many advantages over the well-known Bakelite.

The dioxy compound made as described in Patent No. 1,156,969 is dissolved in formaldehyde. To the solution is then added a condensing agent such as an acid or base, preferably an alkali, or an alkaline earth hydroxide or a salt having an alkaline reaction. Sodium hydroxide, ammonia and an amine are specifically mentioned as possible condensing agents. If desired, heat may be applied to the reaction mixture.

A possible variation of the method is to melt the dioxy compound and mix it with hexamethyleneteramine in the form of a fine powder. Heat should be applied sufficiently to cause the evolution of ammonia.

The product is said to be a gum which is inodorous and varies from a practically colorless and transparent to a dark brown mass, depending upon the amount of heating as well as the kind, amount and purity of the ingredients. It is fusible and soluble in strong alkali, alcohol, acetone, amyl acetate, amyl alcohol, acetylene-tetrachloride and insoluble in oils.

The gum has one particular advantage over ordinary phenol resinoids in that it can be rendered infusible and insoluble by an acid or by means of heat

without pressure. Patent No. 1,225,749 is directed to this feature.

This patent describes several methods for rendering the gum insoluble and infusible. For example, the soluble product is carefully neutralized with dilute sulphuric acid in alcohol, carefully washed and heated in molds.

A variation is to dissolve the gum in ethyl alcohol, amyl alcohol or acetone, add hydrochloric, benzene sulphonic or sulphuric acid to the solution and allow it to stand. Salts such as ferric chloride, aluminum chloride, ammonium chloride or zinc chloride may be added to accelerate the hardening. Merely heating the gum with or without pressure eventually produces the same result.

In Patent No. 1,225,750 dated May 15, 1917, Beatty states that instead of phenol, cresol or cresylic acid may be used in the process, so that the base or intermediate product is really dioxy-ditolyl-dimethyl-methane instead of the dioxy-diphenyl-compound.

The inventor, however, does not intend to limit himself to these ingredients. In Patent No. 1,158,962 he goes on to state that instead of acetone, he may use di-ethyl ketone, ethyl methyl ketone or other homologue and that he may substitute cresol and acetaldehyde for the phenol and formaldehyde.

Applications of the Dioxy Condensation Product

The contributions of Beatty to the rapidly growing synthetic resin art do not stop here. Having described exactly how he proposes to make the condensation product and its various forms, he goes on to suggest possible applications. In Patent No. 1,158,964 which has already been mentioned, the soluble form of the gum is dissolved in alcohol, ether, acetone, acetic acid, amyl alcohol or acetate or acetylene-tetrachloride to proper consistency and molded to the shape of a sound record. After

(Continued on page 448)

The Physical Properties of the Cellulose Plastics

How their origin and the processes of manufacture effect their elasticity and strength.

By O. Manfred and J. Obrist

A communication from the German Technical High School, Brunn, Czechoslovakia

DURING the past six months we have brought articles by the present authors on the mechanical and elastic properties of the various plastic materials, and specifically those of the casein plastics and artificial resins.

The series of articles now beginning cover the different types of cellulose plastics, not only those derived from cellulose esters, but also those including hydrocellulose and paper. The authors' theories regarding these matters will be fully discussed and supported by numerical data.

The articles originally appeared in the German language in the periodical "Kolloid-Zeitschrift", 1927, Vol. 43, No. 1; and have been translated from reprints kindly furnished us by the authors.

HAVING discussed in our earlier articles the effect of mechanical working and plasticizers upon the physical properties and characteristics of a number of typical casein solids and some of the phenoplastics and aminoplastics, we are now, in the present articles, focusing our attention upon the properties of the large group of plastic materials that emanates from cellulose, including therein both the cellulose esters and the various modifications of cellulose as such.

Products Investigated

For the purposes of this investigation we have examined a number of European pyroxylin plastics (celluloids) as for example those produced by the Zelluloidfabrik Speyer; Westfälisch-Anhaltische Sprengstoff A.-G.; and Rheinisch-Westfälische Sprengstoff A.-G. The cellulose acetate plastics comprised the Zellon of the last mentioned company above, the Rhodoid of the French Societe Chimique des Usines du Rhone, and the Sicoid of the Societe Industrielle des matieres Plastiques, Trolit, a plastic made by the Rheinisch-

Westfälische Sprengstoff A.-G., was also investigated. Various samples of vulcanized fiber were also examined. In order to have a fair basis of comparison, a natural product not related to cellulose, namely hard vulcanized rubber, was investigated in a manner similar to that employed in our work on the cellulose plastics. We had also intended to study the behavior of a plastic material known as Monit but were unable to secure the desired articles. As a further means of comparison, we also investigated paper.

The Plastification of Cellulose

As we have already often pointed out and elucidated, what we mean by plastification is the initial disaggregation of the raw material to form individual particles of a size which in general lies within that of medium sized colloid particles, which disaggregation is thereupon followed by more or less complete reaggregation to form basic structures that exhibit marked unidirectional orientation.

The basic structure of the cellulose masses, especially the

fibers of cellulose, is contrasted from that of the proteinoplastics and synthetic resins by being originally fibrous, being thus constituted by nature. Investigations on the nature of cellulose have been carried out by H. Ambrohn, R. O. Herzog, P. P. von Weimarn and others, who have demonstrated that cellulose is a filamentous aggregate of ultramicroscopic crystals oriented in axial alignment with each other, these crystals being imbedded in an intermediate substance. As to what the nature of the imbedding material is, there is not much definitely known. It may be a form of amorphous cellulose, or may be a substance chemically differentiated from the cellulose itself, but this remains as one of the problems to be solved in the future.

The natural fiber structure proved to be a "growth-structure" and the orientation of the microcrystals is produced by the same fundamental reason that effect the crystal-orientation of the artificial fibers, in which latter case it is brought about by the stretching of the fiber during its passage through the coagulating fluid, especially when the precipitation of the fiber is carried out by the stretching method of filament spinning in the making of artificial silk. The fundamental aggregated structure of cellulose fiber persists even if the same is brought into solution, and it is a common phenomenon that cellulose solutions, upon aging, exhibit a tendency to the formation of chain-like fibrous masses or complexes.

Thus, right from the start, cellulose by its inherent nature makes it easier to obtain materials having plastic properties, while in the case of the proteino-plastics and the resinoids the chain-like aggregation must be artificially created. Thus the degree to which the disaggregation is driven in the case of cellulose is determined by the use to which the material is to be put. In the case of paper, for example, the disaggregation (disintegration) is only brought to the stage of particles that are still visible as such under the microscope, and the reaggregation into paper is effected without the use of pressure. In the case of pyroxylin plastics however, the disaggregation is much more far-reaching, and the reaggregation occurs at comparatively high temperatures and under considerable pressure, coupled with the use of substances that exert a powerful peptizing effect upon the cellulose or its esters. For example, in the case of acetyl cellulose (cellulose acetate) the reaggregation takes place at pressures as high as 200 kilograms per square centimeter and at 90°C.

Simple Paper Products

With regard to the technology of the various cellulose plastics only such mechanical properties were investigated as would lead to valuable results from the view-point of the production of plastic materials. The mechanical and chemical "work" done on the cellulose fibers expresses itself in well defined elastic properties of the finished product, and hence this was particularly emphasized in our investigations.

The least degree of plastification is that which occurs in the manufacture of paper from cellulose. The main differences in the various types of cellulose lie in the length of the individual fibers, their thickness, pliability and particularly in their ability to form chains, i. e. their ability to "felt". Thus great variations exist in the cellulose available.

Some of the commoner methods of preparing cellulose are the cooking operations such as alkali boil, sulfite boil, Mitscherlich process, Ritter-Kellner process, wood pulp grinding processes; and the raw materials comprise such a diversity of products as wood, straw, grasses, hemp fibers, cotton and similar sources of cellulose.

Colloiding

Cardboard and papers that are not required to exhibit any particularly great strength can therefore be made directly from wood pulp or other "opened up" cellulosic products, the felting and reaggregation taking place without pressure merely as the result of the drying operation in paper manufacture. In order to obtain a paper of greater pliability and strength it is, however, necessary to shorten the fiber to a range of from 2 to 4 mm. in length, to loosen the internal structure of the fibers and to roughen the outer surface to enable better felting to take place. This is accomplished by grinding the cellulose under water in the so-called "holländers," 1922, p. 18, published also in the washing and stabilization of nitrated cellulose. (The proper control of the disaggregation of cellulose fibers for paper manufacture has been interestingly described by S. Smith in this book "Die Rationelle Theorie des Ganzzeug-Holländers," 1922, p. 18, published by O. Elsner, in Berlin).

A microscopic study of fibers while they were undergoing the grinding process in the holländers has shown that the first noticeable effect is a covering of a sort of slimy material that appears at the ends of the fibers. In the case of linen and hemp this is preceded by a splitting of the fibers longitudinally, which accounts for the great strength of the products made from linen and hemp. It is a very well known fact that the grinding of the cellulose can be carried too far, in fact to the point where the fibrous structure as such will be lost, the entire material being

converted into a sort of slime or mucilage. This is technically termed "dead grinding". Such cellulose will not produce a paper, though it has other uses.

The formation of the slime or mucilage from cellulose by grinding can be considerably furthered by the addition of materials that exert a peptizing action, such as alkalis or acids. It would therefore not be improper to call such additions "plasticizers", as they do effect an increase in the pliability of the resultant products. A preliminary kneading in edge-runner mills or in various types of mixers sometimes precedes the grinding in the holländers. The reaggregation of the fibers, with the production of paper as the result, occurs by causing the fibers to adhere to each other and to form the felt by placing them on a suitable surface so that the water can drain away, the wet felt then being dried and forming the paper. The properties of the paper are in most cases further modified by the addition to the paper pulp of various sizes and fillers.

Our reason for discussing the manufacture of paper is because some of the operations leading to the manufacture of pyroxylin plastics are analogous, and some of the properties of this material can be traced back to those of the cellulose from which it is derived.

The Pyroxylin

Speaking colloid-chemically, the pyroxylin plastics consist of a strongly dispersed and reaggregated cellulose nitrate; the corresponding cellulose acetate products being similar, except that in their case the particles are probably further from the colloid optimum. Our reason for this statement will be apparent when we discuss the mechanical-elastic properties of the latter as contrasted with those of the pyroxylin plastics.

In general the raw material employed for the manufacture of pyroxylin plastics is a thin

(Continued on page 448)

The Patent History of Composite Gears

The course of development during the past three years as shown by the patents

By Joseph Rossman

B. S. in Chem. Eng. LL.B. M. A. M. P. L.

CONTINUING the digests of the patents on the production of composite gears we now come to those which issued from 1925 to date, continuing from the July issue of *Plastics*.

43. Frederick 1,561,222. Nov. 10, 1925.

The method of producing gear blanks consisting in building up a rim section of segmental pieces of woven fabric impregnated with a condensation product binder, the layers contacting each other and being parallel to the plane of the gear, assembling with the rim portion of web portion composed of small pieces of such impregnated fabric irregularly arranged, placing facing sheets on the surfaces of the material and finally subjecting all of the components simultaneously to the action of heat and pressure to consolidate them and produce a unitary structure.

44. Frederick 1,564,774. Dec. 8, 1925.

A self-lubricating laminated composite material of high mechanical strength and free from fusible constituents comprising woven fabric arranged in layers and impregnated with a phenolic condensation product capable of

hardening under heat and pressure, and graphite incorporated in said material, and constituting not to exceed 5 per cent, of the total weight of the material.

45. Carver 1,573,629. Feb. 16, 1926.

The method of making blanks for gear and the like which comprises taking woven textile material which has been treated with a binder, cutting the material into strips in such manner that each strip has a plurality of segmental elements which are joined along one edge only by a few threads, the elements of said strips being counterparts, assembling the strips in a circular mold to form a stack by bending them at said connecting threads, and finally subjecting the stack to heat and pressure to cause the binder to hold the material under compression.

46. Turner 1,575,020. March 2, 1926.

A method of forming composite articles which comprises providing a strip of woven textile fabric impregnated with a binder, said strip having wide and narrow portions, folding said strip on its wide and narrow portions to form a flat helix of contiguous sections with corresponding folds on one side, winding said folded strip helically around the outer periphery of a metallic member with the narrow folds adjacent to its outer periphery and applying heat and pressure thereto to form a unitary mass.

47. Bierman 1,599,550. Sept. 14, 1926.

A composite gear comprising

a metal hub and a non-metallic rim, said rim comprising a helix of fibrous sheet material in the form of an endless strip, said strip having diamond-shaped openings extending transversely thereof and folded lengthwise to provide a folded edge having V-shape notches which are disposed adjacent to the hub, said rim being consolidated with a hardened binder.

48. Guay 1,601,913. Oct. 5, 1926.

A gear having a web comprising a tightly woven fabric in which the threads cross each other at right angles, said web being sufficiently thin so as to yield axially when the teeth are subjected to abnormal pressure, a rim supported by the web and comprising short pieces of twisted cord, said pieces being arranged in layers with the cords in adjacent layers crossing each other at acute angles in the teeth, the inner ends of said cord being anchored to the web, and a binder which holds the cords and fabric in a compressed state.

49. Thompson 1,610,635. Dec. 14, 1926.

A method of forming composite articles which comprises providing a metallic member, the outer surface thereof being knurled and grooved, winding a strip of fibrous material impregnated with a binder around said knurled surface, superposing layers of fibrous material, impregnated with a binder, perpendicular to said strip, and applying heat and pressure thereto to form a unitary mass.



U. S. P.
1,561,222

50. Taylor 1,613,489. Jan. 4, 1927.

A gear comprising a metal hub portion and a non-metallic toothed portion including a synthetic resin in hard infusible and insoluble condition reinforced by metal extensions from said hub.

51. Widmer 1,618,031. Feb. 15, 1927.

A gear blank composed of a plurality of layers of untanned hide previously treated solely with potassium bichromate and alum, and of intermediate layers of adhesive.

pressure to form a mechanical element having a hub and peripheral flange, the web being half the thickness of said parts.

53. Frederick 1,626,230. April 26, 1927.

The process of making gears having webs of reduced thickness, consisting in assembling a plurality of circular discs of woven fabric in parallel planes, superposing on both sides of said discs rings of woven fabric arranged in parallel planes, and having outer diameters of substantially the same outer dia-

54. Frederick 1,636,411. July 15, 1927.

A method of making composite articles consisting in taking particles of fibrous material in dry form impregnated with uncured Bakelite, moistening them with a fluid containing a solvent of Bakelite, subjecting the mass to a pressure and temperature insufficient to cure the Bakelite but to cause the particles to cohere, releasing the pressure and finally subjecting the article thus formed to heat and pressure sufficient to further consolidate the mass and cure the Bakelite.

55. Bierman 1,637,331. Aug. 2, 1927.

The method of making composite articles which comprises providing a metal hub and a strip of fibrous sheet material impregnated with a binder, forming transverse slits in said strip to provide interlocking dovetail sections, twisting alternate sections 180° to dispose the narrow edge of said dovetails on one edge of said strip, winding the strip into a helix about said hub and consolidating the assembled strip by the application of heat and pressure to form a unitary structure integral with said hub.

56. Hoof 1,638,012. Aug. 9, 1927.

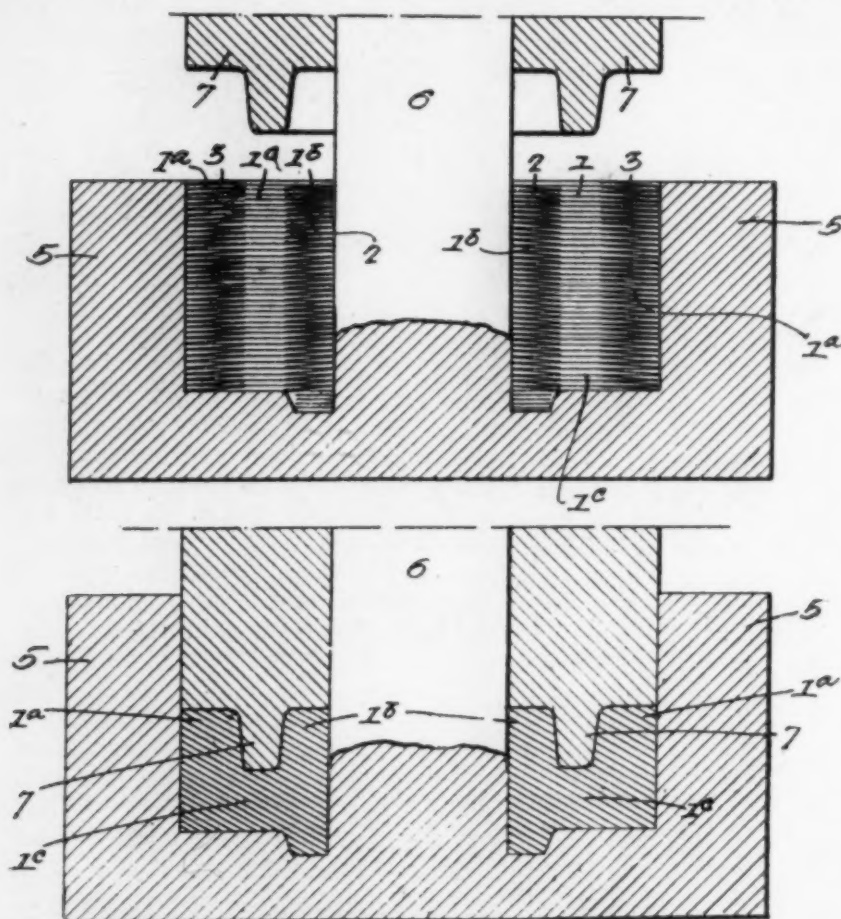
A blank for gears comprising layers of textile material cord, the members of each layer having a radial trend, the members in one layer crossing those in an adjacent layer, and means for holding the cord in a compressed state.

57. Gammeter 1,638,255. Aug. 9, 1927.

The method of making a gear which comprises weaving in helical form a unitary strip of thread-comprising sheet material with the strip radially disposed in the helix, forming an annulus of the strip by securing successive turns thereof together with a bonding material, and forming gear teeth on the annulus.

58. Sprenger 1,643,185. Sept. 20, 1927.

A gear comprising a body portion and a toothed portion
(Continued on page 438)



The mechanical Gear Elements of U. S. P. 1,623,894

52. Taylor 1,623,894. April 5, 1927.

The method of making gears which consists in forming a series of laminations each having a central outwardly extending overlapping portion and a peripheral inwardly extending overlap, impregnating said laminations with a phenolic condensation product; and then exposing said laminations to heat and

pressure to form a mechanical element having a hub and peripheral flange, the web being half the thickness of said parts.



"Laboratory control is perhaps one of the most important essentials to insure uniform quality for plastic material. The Fiberloid laboratories are equipped with the latest scientific equipment. The Directors of this division not only have had technical experience, but practical experience as well. They understand the problems of the large users of pyroxylin plastics.

Whether you need sheets, rods, or tubes, Fiberloid is prepared to meet your particular individual requirements."

The Fiberloid Corporation

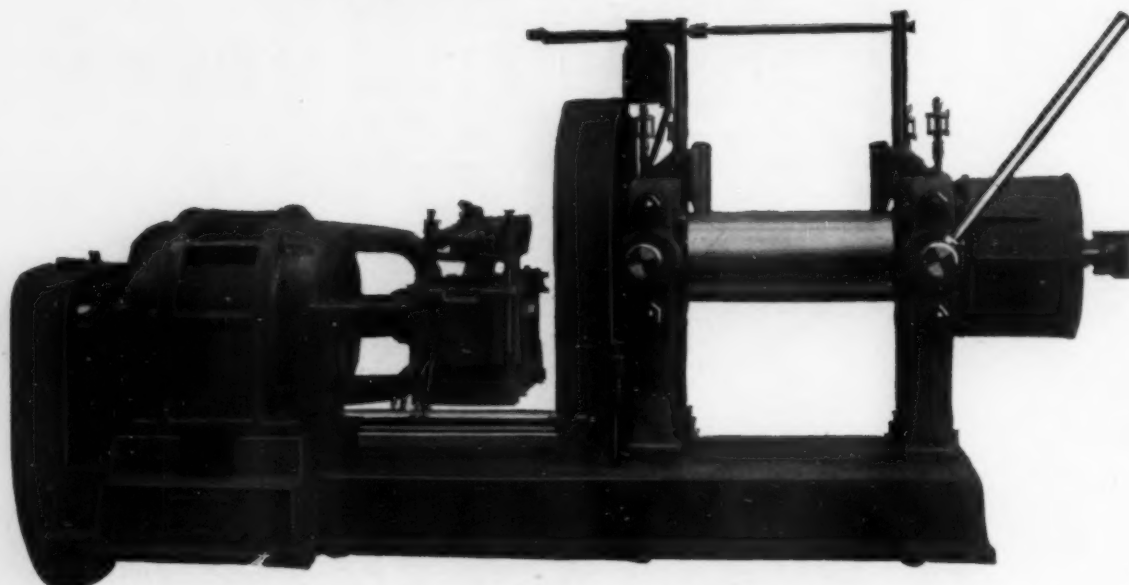
Works & General Offices

Indian Orchard, Massachusetts

New York Office
200 Madison Avenue

Chicago Office
Room 1512 No. American
Building

FARREL-BIRMINGHAM — MACHINERY —



10'' x 20'' Laboratory Rolls

Equipped with Chilled Iron Rolls, Cut Gears, Gear Guards, End-capped Housings and Common Bedplate, carrying entire unit, controlled by Solenoid Brake. Made in various sizes.

Built By

FARREL-BIRMINGHAM COMPANY INC.,
ANSONIA, CONN. DERBY, CONN.

Successor to { Farrel Foundry & Machine Co., Ansonia, Conn., Est. 1848
Birmingham Iron Foundry, Derby, Conn., Est. 1836.

Special Representative **EVARTS G. LOOMIS** 810 Broad St., Newark, N. J.



CARVER LABORATORY HYDRAULIC PRESS

FOR

Plastic Moulding and Other Uses

A small Press at a low price. Self contained with hand pump.
Gives any Load up to 20000 lbs. Adjustable, weight 115 lbs.

Glad to send Details.

Manufactured by

FRED S. CARVER

HYDRAULIC ENGINEERING AND EQUIPMENT

90 WEST STREET

NEW YORK

Also sold by E. G. LOOMIS CO., 810 Broad St., Newark, N. J.

JOHN J. CAVAGNARO

Engineers and Machinists
HARRISON, N. J.

Established 1881

PRESSES FOR
DEHYDRATING
FILTERING
CAKING
POLISHING
STUFFING
ETC.



DIE PRESSES
AND DIES
STEEL STEAM
PLATENS
SEMI STEEL CAKE
PLATES
SLICING MACHINES
CAVAGNARO-
LOOMIS
VACUUM MIXERS

Guillotine Cutter

for slicing masses of material

MACHINERY FOR CELLULOID AND PLASTIC MFRS.

Special Representative

810 BROAD ST.

EVARTS G. LOOMIS

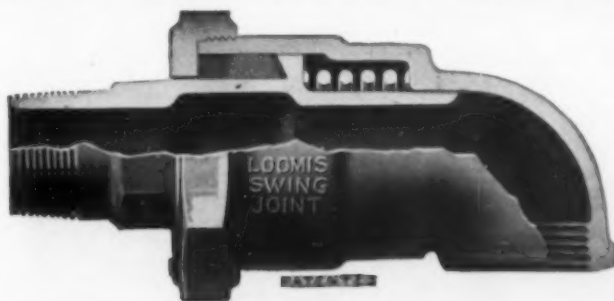
NEWARK, N. J.

LOOMIS SWING JOINTS

The Guaranteed Solution of Your Flexible Connection Problems

The Joint
With
Ten Years
Successful
Service

Order them
now



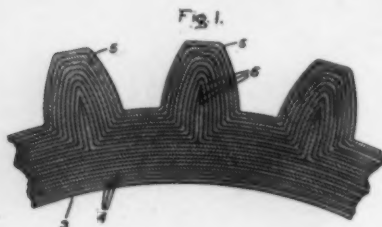
Standard
With
Many Leading
Manufacturers

Send for our
Bulletin "L"

EVARTS G. LOOMIS CO.

A Product of EVARTS G. LOOMIS CO. 810 Broad St. Newark, N. J.

formed of continuous layers of non-metallic material united by an adhesive binder, the teeth being formed by outward projections of the successive layers which form the body portion.



U. S. P. 1,643,185

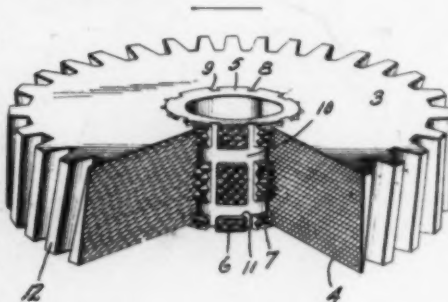
59. Guay 1,646,242. Oct. 18, 1927.

A blank having at least a portion of its rim comprising woven fabric arranged in layers, said fabric being pleated, the pleats increasing in depth from the periphery inwardly, inserts which compensate for difference in thickness of different parts of the rim due to the form

of the pleats, and a binder which holds the fabric in a compressed state.

60. Mansur 1,655,278. Jan. 5, 1928.

A gear comprising a plurality of disks each composed of spinable textiles fibers with a binder material between them, said disks having central openings, the defining walls of which have projections and a metallic hub which is provided with axially-extending grooves into which the fibers of said projections extend.



U. S. P. 1,655,278

Colorless Glycerol Resin

Slow heating of phthalic anhydride with glycerol yields glass-like product

JOHN H. SCHMIDT has assigned to the Bakelite Corporation U. S. Patent 1,663,183, March 30, 1928, covering a process for the condensation of phthalic anhydride and glycerol to produce a substantially colorless product by controlling the speed of the reaction.

A mixture of one part by weight of glycerol with two parts of phthalic anhydride is heated to about 150°-175°C. until the first condensation is complete, the lower temperature ranges being preferably used. The resulting condensation product is poured into molds, and maintained at about 90°C. until it assumes a firm, rubbery consistence. Thereupon the temperature is gradually increased to about 135°C., which is maintained until the resin becomes infusible, and a cooled sample has the desired hardness. In practice the total heating period

may be from 1 to 2 weeks, more or less, according to the size of the molds, the precise temperature employed, the degree of hardness and other qualities desired in the product, and similar factors. The resulting resinous condensation product is transparent, free from bubbles or flaws, practically colorless, tough, infusible, and sufficiently thermo-plastic to enable it to be molded under application of heat and pressure, as for example in a hydraulic press having steam-heated platens.

The product is usually tinted or colored by the use of appropriate dyes or pigments, introduced into the mass before or during the initial condensation. A wide variety of non-fugitive dyes and coloring matter is available for this purpose. The resulting color effects are remarkably pure and brilliant, owing to the absence of coloring

matters formed during the condensation or baking, and therefore for convenience designated "inherent color."

For the purposes of this invention the product before the introduction of extraneous coloring matters, should be substantially free from inherent color, that is to say it should be practically "water-white," as distinguished from the yellowish color of these resins as heretofore prepared.

The claims cover:—

1. Process comprising reacting with phthalic anhydride upon a polyhydric alcohol at a temperature below 175°C. to form a colorless initial condensation product; subjecting said product to prolonged heating at temperatures below that at which a substantial amount of inherent color is formed; and continuing the heating until a hard, tough and infusible product substantially free from inherent color is produced.

2. The herein described novel condensation product of phthalic anhydride and a polyhydric alcohol, characterized by hardness, toughness, infusibility, and substantial absence of inherent color.

Dimethyl Urea As Cellulose Ester Plasticizer

AN invention that is dedicated to the public, so that it may be used by any one without the payment of any royalties is somewhat of a rarity in the plastics field, for with the exception of some work on the production of furfural done by the government some years ago, none of the government employees appear to be working on problems relating to the resins or cellulose esters.

However the use of dimethyl urea and diethyl urea as a plasticizer for cellulose nitrate is now free to anyone in the United States, thanks to U. S. P. 1,654,114; Dec. 27, 1927, granted to

(Continued on page 454)



Dr. G. E. Landt, chief chemist of the Celoron Laboratories and the man responsible for the development of Celoron Molding Powders.

Dr. G. E. Landt says:



A corner of the Celoron Research Laboratory where theory meets the acid test of actuality. A sample batch of a new resin is here being prepared for tests under conditions duplicating normal production in a molding plant.

★ ★ ★

Celoron Products

Celoron Molding Powders; Impregnated Fabric and Paper for Molding; Synthetic Resins, Varnishes and Cements; Laminated Celoron sheets, rods and tubes for radio, electrical and industrial purposes; Celoron Silent Gears.

The following statement by Dr. Landt, director of the Celoron Laboratories, is typical of the earnest spirit of service to the molding trade that has ever motivated him and his men. His appeal to you to let them assist in solving your molding problems is genuine and is a real opportunity that may result (as it has many times before) in materially improved products and substantially lowered manufacturing costs.

"Experimenting with a material in production is costly. We have done the experimenting so you won't have to. Celoron has been proved in every respect, side by side with every other molding powder made.

"If Celoron Molding Powders were not *better*, they would never have been offered to the trade. There is no room for 'just another molding powder' in the scheme of things today.

"Having produced an improved product, we are most anxious that everyone using it will be familiar with its advantages and will gain the greatest benefit through its use. To this end we—who have produced Celoron Molding Powders, and naturally know their many possibilities—urge you to bring your molding problems to us for assistance in fitting the material to the task."

A card will bring further information. Write today.

THE CELORON COMPANY
Bridgeport Pennsylvania
In Canada: 350 Eastern Avenue, Toronto



CELORON

MOLDING PRODUCTS

The World Trade in Plastics

The Baltic Countries: Norway, Latvia, Lithuania and Esthonia, Dutch East Indies

By C. C. Concannon

Chief, Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NORWAY is practically a virgin field so far as the production and consumption of all forms of plastics are concerned. One firm, "Norsk Spraengstofindustri A/S" of Oslo, states that they are manufacturers of pyroxylin, but that no local consumption exists. The reason for the apparent lack of interest in plastics is to be found largely in the absence of consuming industries. No factories exist which produce the various articles made from plastics, the bulk of these being imported in a finished state, coming largely from Germany, France, Belgium, Great Britain, and the United States.

Market Possibilities for Synthetic Resins

Because of the entire absence of synthetic resin production in the Norwegian market, a fairly good opportunity for introducing it apparently exists. Norway by reason of its large supply of hydroelectric power is far ahead of the majority of other countries in the matter of electric development and as a result has a rather extensive electro-technical trade. Formerly this industry has obtained its supplies of insulating material in finished form from abroad, but it is known that several of the larger establishments would welcome an opportunity to establish a domestic production. One of these firms which has expressed an interest in the matter is N. Jacobsens Elektriske Verksted A/S of Oslo.

Outside of the electro-technical branch, the opportunities for the sale of plastics and forming equipment are, however, small. The piano industry is

In our previous articles in June and July, we have taken up the plastics trade of the Netherlands and Austria.

These reports are based on articles issued by the United States government, originating from the Trade Commissioners stationed at the respective countries.

of small importance, the total requirements being estimated at less than 200 sets of keys annually, the majority of which are at present imported from Germany. The material is known under the trade name "Ifenbenit" which is produced by the firm of Herman Skluge, Bremen. The keys sell for approximately \$26.40 to \$28.60 per set.

The cutlery industry and the manufacture of buttons, umbrellas, novelties, and toilet ware are very small. The majority of such products are imported in the finished state.

Trade With United States

The exports of pyroxylin plastics, such as celluloid, pyralin, viscoloid, and fiberloid, to Norway from the United States during recent years have been as follows:

Year	Pounds	Value
1922	348	\$284.00
1923	109	66.00
1924	150	133.00
1925	81	81.00

THERE is no plastic industry in Latvia, Lithuania, or Esthonia. The three countries are too small to support a local industry, and every attempt to build up an independent industry meets with poor success due to German competition. Ger-

many boasts of an old, well developed, and effective plastic industry, producing at a relative low price. The plastic industry requires large capital, mass production, and a ready market, all of which are absent in this territory.

No hope is maintained of building up an important export business, if there were a local plastic industry. With the absence of the necessary raw materials and the cost of production, the domestic industry could not compete in price on foreign markets. The only raw material found locally is casein, but it is never worked into a finished product and therefore is exported in a crude state.

All finished manufacturers of the industry are imported from Germany which country supplies the three countries in mass quantities at a very low price. Under the existing conditions there is no possibility of importing any kind of plastic for fabrication into this territory from the United States.

Dutch East Indies

So far as the representatives of the Bureau of Foreign and Domestic Commerce have been able to ascertain, there is absolutely no industry in the Netherlands East Indies making use of plastics. The country is agricultural, rather than industrial, consequently the manufacturing industry is very slightly developed.

American statistics record shipments of plastics to the the three years, 1923 to 1925 Netherlands East Indies during aggregating about \$1,200. These apparently represented small lots of transparent sheeting used by the automobile trade.

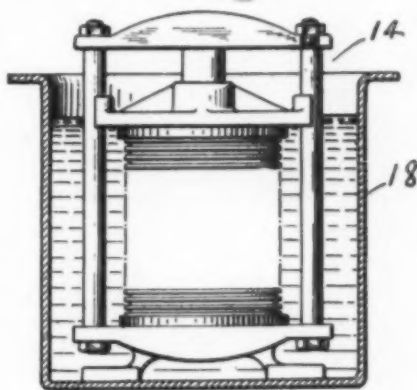
Molding Sound Records In Presses Under Hot Water

HARTWELL W. WEBB, of Leonia, N. J., makes a rather novel proposal for the production of molded products, specifically sound records for phonographs.

In effect it amounts to assembling a number of thermoplastic sound-record blanks together with the record-molding negative dies, clamping them together tightly in a suitable holder, and then immersing the assembly in hot water. After a sufficient lapse of time, the record blanks and molds are transferred to cold water until thoroughly chilled, and are then disassembled and the finished records removed. As a large number of records can thus be made at one time, the process is said to be very economical.

Evidently the idea is applicable to other molding operations involving more or less flat objects, although hardly suitable for phenolic resinoids. The process is covered by U. S. P. 1,653,524; granted Dec. 20, 1927.

As will be seen from the illustration, the clamping device 14 is made up of the two head members adapted to receive between them a group or series of record blanks and masters arranged in alternation for single-faced records, and with two masters placed back-to-back alternately. After applying pressure the assembly is plunged into hot water to cause the plastic to flow and conform to the dies. It is then removed and put into cold water to set the records, which are then removed.



U. S. P. 1,653,524

ed to that purpose. In the patent, which is assigned to the C. F. Burgess Laboratories, Inc., of Dover, Del., by way of illustration the inventors describe a method of carrying out their invention.

Dolomite Filler

An alkali silicate, such as sodium silicate, having a density of about 42.5° Bé. is intimately mixed as in a mixer with a filler to form a dough having a consistency about like that of putty. The amount of filler varies with its character, for example in using dolomite the filler constitutes about 60% of the weight of the wet mix, while in using kieselguhr or sifted coal ashes, the filler constitutes only 20% of the weight of the wet mix. The dough or mix thus formed is then introduced into the mold, the volume of which should be from about two to eight times the volume of the batch introduced. The mold may advantageously be of iron with the surface greased to prevent adhesion of the dough, though provision must be made for the escape of steam. When the batch is heated, the mold must be of such shape and so arranged that no great loss of material will occur through excessive puffing or frothing of the batch.

Expanding

The next step consists in heating the mold to produce expansion of the batch. An advantageous arrangement is to have the mold walls hollow and steam tight, and to heat them with steam at a pressure of about 170° C. where the surface of the mold contacts with the batch. The application of heat of about that temperature causes the dough to puff up until it fills the entire mold. During this heating and expanding process water is driven off from the mixture, and the silicate undergoes a physical change, and there may even be a chemical reaction between the silicate and the filler. In any event after about ten to thirty minutes, when making

(Continued on page 453)

Molding Porous Plastic Articles

Expansive property of sodium silicate used with inorganic substances.

THe molding of highly porous articles from comparatively incombustible materials is the object said to be attained by Howard F. Weiss and Ralph F. Norris of Madison, Wis., who have been granted U. S. P. 1,628,206 on May 10, 1927, on an application filed June 17, 1924.

The basic principle underlying the invention is the fact that sodium silicate (water-glass) will puff up to many times its natural size when heated, while at the same time will act as a strong inorganic binding agent.

Quite a large number of plastics have appeared in the past fifty years comprising sodium silicate as a binder, but in the present instance the great expansion or intumescence of the sodium silicate is taken advantage of in the molding of objects having a very large number of pores, so that they will form excellent heat insulators.

While the inventors apparently have the making of elements for building purposes in view, it is quite evident that the process is not necessarily limit-

Research Activities in The Rubber Plastics

In order to hold their own against the constant growth of the newer plastic materials, the rubber chemists are contributing many new and useful products that mold quickly and cleanly.

By Carl Marx

For many years hard rubber maintained an enviable position in the molding industry. The hardness and chemical inertness of this material and especially its resistance to acids, made it an indispensable adjunct to the storage battery and for similar articles. The advent of rapid curing rubber products will have a distinct influence on the general plastic field.

THE active competition between the modern resinoid plastics and hard vulcanized rubber or Ebonite, has spurred the rubber chemists on to research work. The main attempts seem to be directed toward the preparation of thermoplastic and thermo-set materials that can be worked and molded rapidly and without the long extended vulcanization or cure. The advent of the rubber accelerators shortened the time required for vulcanization and in some cases also lowered the temperature and the amount of sulfur required. The present tendency however is toward the entire elimination of sulfur and the production of powdered materials that will flow and unite under heat and pressure and immediately thereupon assume a non-melting mass that can be removed from the molds without distortion or warping.

Patented Ideas

The activity of this art is exemplified by the numerous patents that issue. While some relate purely to rubber, there are quite a few that combine the plastic materials as we generally know them with the rubber hydrocarbon or directly with

latex and the like. Some of the recent patents (between April and June 1928) disclose some interesting applications of cellulose plastics to the rubber art. For example:

Use of Pyroxylin Films

Axel T. Gustafson, of Gottenborg, Sweden makes use of cellulose ester foils in the accurate molding of rubber composition. According to his U. S. Patent 1,665,355, April 10, 1928, when producing articles in molds from rubber, gutta-percha, and other substances which are plastic when heated but stiff or elastic when cooled, difficulties frequently arise through the heated substance when in a soft or half melted state sticking to the mold employed and this sticking persists even after cooling down. This causes, in the first place, a primary loss of substance and, in the second place, a necessity for mechanical treatment of the surface of the article, in order to obtain the requisite smoothness and shine. Such mechanical treatment leads to a secondary loss of substance. Thus the molded mass in its finished state fails to conform with any degree of exactitude to the mold or to the original object or pattern,

from which said mold was produced.

The sticking effect varies considerably with the nature and condition of the substance to be molded and of the mold itself. If, for instance, molds of plaster of Paris are used, the sticking effect partly arises from its known porosity. Metal molds, when the substance used contains sulphur (as in rubber compounds), set up chemical processes such as sulphidation.

Foil-covered Molds

The new method which forms the subject of Gustafson's process, will hereinafter be described in its application to a plaster mold employed in molding a rubber substance, that is to say, unvulcanized rubber with an addition of sulphur. In this case the difficulties above mentioned are particularly prominent and numerous means for avoiding them have been proposed.

When using the old methods the sticking effect could, in some cases, be avoided or diminished, the keen relief frequently desired on the molded article was not obtained, for instance, when using collodion solutions smeared onto the mould, because of the impossibility of applying the solution in an absolutely uniform layer. In practice the solutions were found always to accumulate in the lowest parts of the mould (the furrows and cavities thereof) so that such parts were partially or wholly effaced.

Also in cases where some kind

of plastics were used as interposing material, for example, pyroxylin plastic, a sufficiently uniform layer can not be obtained for the same reason as set forth regarding the use of liquids.

The essential properties of an ideal foil for the purpose referred to are as follows:—

It should be as thin as possible; this quality becomes the more essential the smaller the object to be reproduced and the more intricate and richly detailed its surface.

It should be of uniform thickness and mass.

It should be pliable, so that it conforms easily to the features of the mould.

It should, to a certain extent, be elastic, so that it may, without bursting, follow the details of the mould when the mass is exposed to pressure.

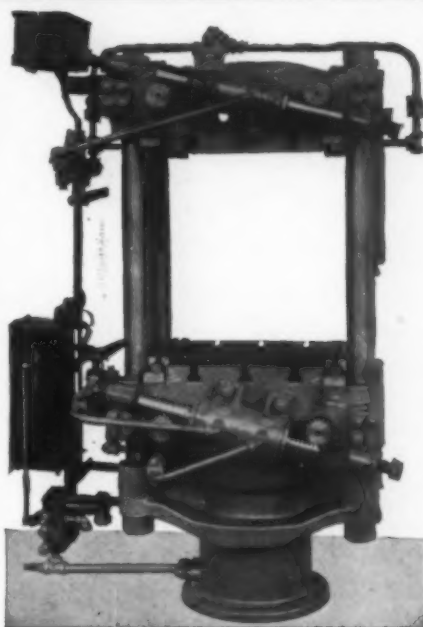
It should be able to be damped (i. e. to absorb liquid) for the purpose of increasing its pliability and flexibility.

It should not take up particles either from the plastic mass or from the material of the mould, nor should it deliver particles to them.

Prerequisites

It should be resistant to increased temperature and humidity without becoming loose, disintegrating or changing chemically. A foil possessing the properties mentioned can be made from cellulose derivatives, such as gelatinized nitro cellulose with or without camphor (celluloid, or colodion), acetyl cellulose, also other acetylated products and certain cellulose ethers with alcohol radicals. However the foil which is most suitable for the purpose here contemplated and which has best endured the test is one made of such derivatives of cellulose as scientifically are called cellulose hydrates. By cellulose hydrates I mean all such cellulose derivatives which are obtained when common cellulose is treated with chemicals such as zinc chloride, cupri or

(Continued on page 451)



Semi-Automatic
80 Ton Bakelite Press

Moulding Presses

For all Plastic Materials

This cut shows one of ten presses with adjustable ejectors on both top and moving platens.

The high and low pressure operating valves are manipulated by an automatic electric valve control, without cams or shafting.

We manufacture hydraulic presses for all hot and cold moulding processes and also complete equipment including hydraulic accumulators, pumps, valves and piping.

Write for our pamphlet—
A new Automatic Control for
Hydraulic Machinery.

R. D. WOOD & CO.

PHILADELPHIA, PA.

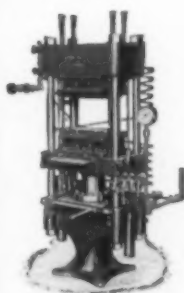
Established 1803

Works: Florence, N. J.

MOLDING PRESSES

UPWARD or
DOWNWARD

Fig. 1



To
Suit
Your
Work

ANY SIZE
ANY PRESSURE

Let us help
you work
out your
problems



Established 1872

Dunning & Boschert Press Company, Inc.
No. 330 West Water St.

SYRACUSE, N. Y.

Byron B. Goldsmith—A Pioneer In Casein Plastics

From 1898 to within recent years, this investigator was working on the problem of casein plastification

By The Editorial Staff of Plastics

ONE of the pioneer workers with casein, to adapt this versatile material to its manifold industrial uses, and on active inventor in the field of casein plastics was Byron B. Goldsmith. His work in this art dates back to 1898, and he was still actively engaged in following up the progress in casein solids up to a few years before his death, which occurred last September.

Coating Compositions

His earliest American patent in this field issued December 6, 1898, No. 619446, and covered a coating material suitable for fibrous or absorbent surfaces. It was especially intended as a sub-coat for coats of pyroxylin enamels, and specified that the casein was to be dissolved in water containing substances that would cause it to pass into solution. The addition of glycerol to impart suppleness was also suggested.

Thus having become interested in casein, and while working at the time with the pyroxylin plastics, Goldsmith then turned his attention to the solution of a problem that is still engaging the attention of many investigators even to this day, namely the production of thermoplastic compounds from casein, either alone or in admixture with pyroxylin and similar plastics.

His first patent along these lines, and the beginning of a long series of improvements, is No. 840931, Jan. 8, 1907. This broadly claimed a process of making a composition of matter

By no means all the early work on the casein solids was confined to Europe. Mr. Goldsmith, who died just about a year ago, was an ardent worker in the general field of plastic materials and his efforts to produce thermoplastic moldable casein solids make interesting reading when viewed in retrospect from the present high state of development in this art.

which consists of uniting casein with an agent or agents that render the same moldable or thermoplastic.

Goldsmith apparently was on the search for a material that would do to casein what camphor does to cellulose nitrate, namely a casein plasticizer or "casein-converter" as he called it in the 1907 patent. His aim was to produce a composition from casein that would become plastic when heated so that it might be used for the same purposes as celluloid, and as a substitute for horn and soft rubber. He says that his compound could be rolled out into sheets, molded and remolded a number of times.

Casein Plasticizers

The particular substances that Goldsmith relied upon to plasticize the casein were: alpha-naphthol, beta-naphthol, benzoic acid, phenol, hydroquinone, cresol pyrocatechin, resorcinol, salicylic acid and urea, although he definitely states that he does

not want to limit himself to the particular substances described.

The true mechanism of the reaction between the casein and the plasticizing agents was at that time not properly understood, but Goldsmith describes one experiment in which he melted some resorcinol and dropped casein into it, when it appeared to dissolve and fuse into a homogeneous plastic mass. For commercial purposes, Goldsmith proposed to mix three pounds of casein with one-half pound of betanaphthol dissolved in a pint of alcohol, working the mass on malaxating rolls much in the same manner as pyroxylin is incorporated with camphor. Glycerol was also added when a particularly supple mass was to be the result. This is probably the first patent on making moldable thermoplastic casein materials, and expired in 1924 (the life of a United States patent being 17 years).

A Casein Phonograph Record

We doubt if many of our readers are aware of the fact Goldsmith, on the same day as the above patent also received one for the making of a gramophone disc record from molded casein, using the product just described. This sound-record tablet patent is No. 840932, Jan. 8, 1907. His process consisted in plasticizing the casein with beta-naphthol, forming the material into a sheet on rolls, and using the product to mold records from the usual matrices under pressure, in the same way as shellac

records are molded. In fact he proposed to mix shellac and similar materials with the casein. The claims, in view of the fact that he was the first in this art are very broad, and cover, for example "A sound record tablet having a record-surface of casein" and "A sound record tablet of casein." This patent also has now expired, so that there is nothing to prevent anyone from utilizing this invention.

Two years later, Goldsmith applied his process also to other albumenoid substances than casein, for example such materials as blood, egg-albumen, gelatin and the like, using aromatic amines as the plasticizing agents. For example, according to his patent No. 922,133; May 18, 1909, he would mix the albumenoid substances with naphthylamine benzidine, aniline, toluidine, xylydine or diphenylamine dissolved in alcohol, working the mass into a plastic state. The process also contemplated taking a quantity of curd which would weigh four pounds if dry and sprinkle it with one of the above substances dissolved in alcohol, working the mass on heated rolls. Scrap celluloid could also be added, in fact almost all of Goldsmith's work shows his leanings toward the pyroxylin plastics.

Keratin Plastics

In the same year, he received his patent No. 922,692, May 25, 1909, which applied his albumenoid plasticizing process to keratin. Keratin is the basic substance of horn, hair, wool and feathers, and Goldsmith states that he can plasticize the keratin with such substances as the naphthols, benzoic acid, phenol, hydroquinone, cresol, urea, phthalic acid, phloroglucinol, pyrogallol, oxy-naphthoic acid and aromatic amines such as aniline, etc. The claims are much like those of his 1907 casein-plastic patent.

About a week later he was granted patent No. 923,353, June 1, 1909, which applied the al-

(Continued on page 454)

AGAIN SOMETHING NEW FROM **STOKES**



Highly important improvements to preforming presses! This accomplishment results from changes in design and some materials made after months of study and experimentation under actual factory service conditions.

In line with the Stokes policy, however good a machine may be, constant effort is being made for still further improvement.

For further details, see this space next month, or if you're interested right now, write and you'll get the information promptly.

FJS **STOKES MACHINE COMPANY**

Special Process Machinery Since 1895

5834 Tabor Road

Olney P. O.

PHILADELPHIA, PA.



A few of the many intricate shapes which can be made on Stokes Presses

TUMBLING

A NEW TUMBLING METHOD

FOR

**ZYLONITE
CASEIN**

**PYROXYLIN
BAKELITE**

HORN

This Method eliminates buffing cost.

There is no rubbing or tripoli polishing necessary before or after tumbling.

A brilliant and lasting finish is applied to each piece, equal if not superior, to results obtained from present methods of hand polishing.

Your finishing costs can be materially reduced by this revolutionary method of tumbling your parts.

We will gladly tumble samples without cost.

METHODS, EQUIPMENT, FORMULAS

CONSULTING

OPERATIVE

Rudolph R. Siebert

449 CUTLER BLDG.

ROCHESTER, N. Y.

TECHNICAL ABSTRACTS

AND PATENT REVIEW

Aminoplastic Product. British Patent 271037, May 15, 1926. Kunstharzfabrik Dr. F. Pollak Gesellschaft.

Concerns the production of an intermediate condensation product in the form of a solution which is treated with a reagent that precipitates out the condensation product, which is washed and dried. The product is then employed for molding under heat and pressure.

Aminoplastic Product. British Patent 271264, June 22, 1926. Traun & Sons, formerly Harburger Gummi-Kamm Co.

Glass-clear condensation products are produced by mixing aqueous solutions of higher aldehydes (polymers of formaldehyde with urea and heating them together until condensation is effected. The product is further hardened by heating at temperatures below the boiling point of water.

Manufacture of Cellulose Acetate; apparatus for. British Patent 270656, May 10, 1926. Societe Chimique des Usines du Rhone.

Description and illustration of an apparatus particularly designed for the acetation of cellulose.

Proteinoplastics from Casein, Blood, etc. British Patent 272947, June 17, 1926. Jaroslaw's Erste Glimmerwarenfabrik, Berlin.

A moldable plastic mass is prepared from casein, blood or intestinal mucous and similar proteid materials by heating them with a polymer of formaldehyde in the presence of ammonia. The resultant products are precipitated, and form a moldable material. The properties of the product may be modified by the addition of phenols, plasticizers and fillers.

Impregnated Paper Sound Records. British Patent 272910, June 18, 1926. C. Parolini.

Fibrous discs, such as cardboard, are impregnated or coated with a resin such as shellac, and then coated with a varnish comprising a cellulose derivative. Alternate thin layers of shellac varnish and cellulose varnish may be employed, each coat being allowed to dry before the next one is applied to keep them separate. The blanks thus produced are then molded in hydraulic presses as usual.

Pearl Effects in Plastics; Imitation Tortoise-shell, etc. British Patent 272869, June 19, 1926. J. Paiseau.

Plastic materials such as cellulose nitrate or acetate plastics are mixed with pearl essence, fish scales and the like as is usual in the production of imitation mother-of-pearl, and the

similarity of the material to the natural objects of which it is an imitation is further enhanced by forming a multitude of minute bubbles in the mass. This is done by incorporating with the material a solvent volatile at comparatively low temperatures and then heating the material above the boiling point of the solvent, or by extruding the mixed material from a heated die. An alternative method is to incorporate ammonium carbonate or similar substance with the plastic, followed by heating to form carbon dioxide and ammonia, which produces the desired bubbles in the mass.

Ethyl Mandelate as Pyroxylin Plasticizer. British Patent 270650, May 4, 1926. H. W. Matheson.

The use of ethyl mandelate, or corresponding ester of mandelic acid as a plasticizer for cellulose nitrate is described.

Resinoids from crotonaldehyde and aromatic amines. British Patent 270433, Feb. 15, 1926. Interessengemeinschaft Farbenindustrie (German Dye Trust).

Aniline or ortho-toluidine is condensed with crotonaldehyde to form a resinoid substance. No catalyst is used. The materials may be dissolved in solvents such as benzene or acetone.

Blood Plastics. British Patent 273380, Nov. 3, 1926. F. Homberg.

Blood, either dry or somewhat moist, is mixed with a mineral filler and molded by heat and pressure, being afterwards indurated by treatment with formaldehyde. Other substances capable of tanning proteins, such as chromic acid, aluminum salts or tannic acid may replace the formaldehyde. To get a lighter colored product the blood may be bleached by acting on the same with chlorine, sulfur dioxide or hydrogen dioxide.

Resinoids from vegetable oils and synthetic resins. British Patent 273290, June 25, 1926. L. V. Adams.

Esters of the fatty acids derived from vegetable oils such as linseed oil, castor oil, soya bean oil, etc. are mixed with the condensation products of glycerol and phthalic acid; or with those of phenols and aldehydes, or with natural resins as shellac condensed with tannic acid etc. Modifying agents as benzyl benzoate, benzyl acetate, aromatic amines, nitrophenols, and similar materials may be added. The products are capable of being rendered infusible by heating in a mold.

Cellulose Acetate Manufacture. British Patent 269543, April 15, 1926. Verein f. Chemische Industrie A.-G.

The mixture of acetating bath and cellulose acetate is poured into water to precipitate the cellulose acetate, which is then strongly pressed to remove as much of the bath as possible, and then washed with water. A special apparatus suitable for the purpose is described in detail.

Manufacture of Cellulose Esters. British Patents 269529, 269530 and 269531. G. W. Miles and C. Dreyfus.

Cellulose esters, such as cellulose nitrate, may be made by nitrating in the presence of phosphoric acid (either ortho or meta or both). The second patent extends the idea to the organic esters of cellulose, and the third to etherification of cellulose. The fundamental idea is the use of phosphoric acid in the operation. (Further details will appear later).

Synthetic Resins. British Patent 269973, Jan. 27, 1926 Griffiths Bros. & Co. (London), and R. Britton.

Benzyl or cinnamic alcohols are polymerized and formed into resinous bodies by heating in the presence of phosphoric acid, sulfuric acid or phosphorus pentoxide. The first stage of the reaction is performed at around 130°C, the later stage at around 180°C. An alternative is to heat a mixture of phosphoric acid, an aromatic hydrocarbon and formaldehyde, whereby the alcohol is first formed and later polymerized.

Insulating Material. British Patent 270535, Aug. 17, 1926. D. M. Sutherland, Jr.

Cellulose Acetate. British Patent 265267, Aug. 7, 1926. L. Levy and O. Silberrad.

Cellulose is esterified with the usual mixture of acetic anhydride and acetic acid without the use of sulfuric acid as a catalyst, the catalyst used by the inventors comprising a chromium compound, such as the sulfate, nitrate, acetate, butyrate, chromium-benzene sulfonate or naphthalene sulfonate and the like. Hydrated chromium oxide may be used for the same purpose.

Resinoid Products from polybasic acids and polyhydric alcohols. T. Hedley Barry, in *Industrial Chemist* (London), 1928, 4, 53.

The article is an interesting review of the progress made during the past decade in the production of synthetic resins from such materials as pythalic acid and glycerol, the most characteristic of which is the resin that has

become known as "Glyptal." The production and uses of these resins is discussed. bibliography, including patents, forms part of the article.

Aniline and toluidine resins. British Patent 274155, March 15, 1926. Interessengemeinschaft Farbindustrie (German Dye Trust).

Aniline, ortho-toluidine or analogous aromatic amines are condensed with formaldehyde in the presence of salts of these compounds. The condensation may be carried out in dilute solutions of alcohols in which the amines are soluble. The products are soluble in alcohols, but not in alkalis.

Dissolving "insoluble" resinoids, and products resulting therefrom. British Patent 273748, July 1, 1926. L. V. Adams.

Resinoids, in the "C" stage, are made to dissolve in the following solvents by heating them with the same above the melting points of such of the solvents as are solid at room temperature. The following solvents are mentioned: acetone, acetone oils, benzyl alcohol, benzyl acetate, benzyl benzoate, cresol, tricresyl phosphate, triacetin, glycol diacetate, diethyl phthalate, toluidine, anisole, ortho-cresyl benzoate, ethyl lactate, indene or indene resins. The solutions, by dilution with solvents, may form the basis for lacquers and the like.

Resinoids from phenol and dextrose. British Patent 274146, Feb. 9, 1926. J. V. Meigs.

The use of dextrose, in the form of crude corn sugar for the production of a synthetic resin is described. The product, which is suitable for hot-molding, is made by mixing phenol and corn sugar in the presence of sulfuric acid as a catalyst and boiling the mixture, allowing water to escape but returning the phenol to the reaction mixture. The condensation takes place between 120 and 180°C. Stearic acid, to prevent sticking in the molds, may be added. The product is dehydrated in vacuo, whereby the excess of phenol is also removed. Wood flour or similar filler is then added, plus a sufficient amount of hexamethylenetetramine to cause the induration of the production when the same is molded.

Analogous methods, employing furfural, aniline and the like are likewise described.

Retention of moisture by cellulose compounds. A. Caille, in *Chimie et Industrie* (French), 1928, 19, 402.

A discussion of the causes of the hygroscopicity of cellulose esters, specifically nitrate and acetate, claimed to be a function of the sulfuric acid retained in the ester from the nitration or acetylation stages.

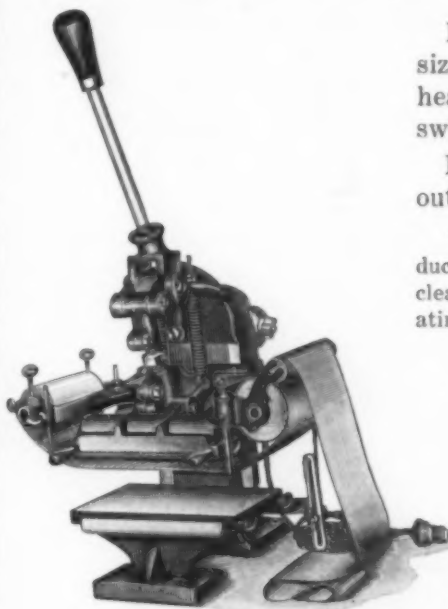
Correction!

The German book on "Non-Rubber Molded Insulation" by Dr. Ing. Arthur Sommerfeld reviewed in July, p. 387 is priced at 3 mark 60 pfennig, or approximately \$1.00. This information was omitted in the review.

Our Gold Inlaying Press

WITH AUTOMATIC ROLL FEED

is just what you have been looking for. Will take Roll Leaf any width to 5". Positive feed from 1/4" to 5 1/2". Set ups and adjustments quickly made.



Press is made in three sizes furnished complete with heating units and 3-way switch control.

Presses sold with or without roll feed.

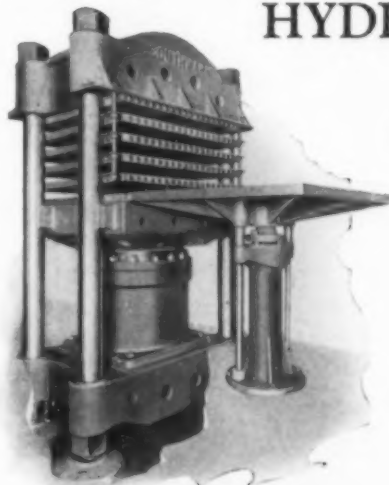
This Press will speed up production. The stroke gives ample clearance to feed in work eliminating the draw plate operation.

Write for full particulars.

**Standard
Tool Company**

75 Water Street
LEOMINSTER, MASS.

SOUTHWARK HYDRAULIC PRESSES



fitted with

STEEL PLATENS

make the best products

**We Have a Press
Exactly Suited
To Your Work**

**HYDRAULIC PUMPS
ACCUMULATORS
VALVES, FITTINGS
PIPE, ETC.**

ESTABLISHED 1836

**SOUTHWARK
FOUNDRY AND MACHINE CO.**
400 Washington Avenue, Philadelphia, Pa.

Akron, O.
100 E. South St.

Chicago, Ill.
343 S. Dearborn St.

Dioxy-diphenyl-dimethyl-methane Plastics and Their Uses

(Continued from page 430)

the impression of the sound grooves, the record is hardened by means of heat, but the same result may be obtained without heat if the gum is made acid in reaction. Fillers such as very finely divided graphite, wood powder, lampblack, steel dust or oxide of iron may be incorporated into the gum, if desired.

In Patent No. 1,158,965 it is suggested that the gum be used together with an organic substance such as sugar, glucose or turpentine and an acid such as sulphuric to impregnate wood, paper, cloth or leather to increase their resistance to chemicals and electricity. Soft woods treated as described are said to take on the properties of hard woods.

Impregnation

Patent No. 1,158,962, which has already been mentioned as suggesting the use of homologues of the reagents in the condensation, claims a fabric impregnated with the condensation product. Its disclosure is, however, not so limited and covers uses and applications in many entirely unrelated arts.

Blocks of wood, cement or other porous material may be impregnated with the gum and used as tiling or floor covering. The gum itself may be used as ordinary varnish in polishing floors, in which case it should be acidified to cause the coating to harden. The same result may be achieved by heating the coated article.

In alcohol or acetone solution the gum may be applied to leather in exactly the same manner as pyroxylin. Either the gum or the leather may be suitably colored. Fabrics such as cloth or paper may be coated or impregnated and used for roofing material or as lumber, or may be wrapped around wires for in-

sulation. When used in roofing fillers such as sand should be incorporated. For other purposes fillers such as leather dust, wood dust or graphite may be incorporated.

The gum itself may be used as a coating to insulate wires or with fillers such as silex, lampblack or pigments especially when used as a substitute for rubber in lamp sockets. Dissolved and mixed with pigments such as lampblack or zinc oxide, the gum is suitable as an enamel. Heated or not the gum may be used to coat metal articles such as pans, dishes, paper containers or containers for food. It may also be used to coat statues, houses, cement structures, bricks, shingles or roofs of houses, or walls of rooms, especially bath rooms. Dissolved in amyl acetate and loaded with finely divided aluminum or pigment it may be used to paint radiators. The gum may further be used to coat celluloid articles such as brushes, combs, buttons, or moving picture films.

The gum may be colored with aniline dyes or pigments to serve as a substitute for ivory, horn, amber or tortoise shell. It serves well as an adhesive, cement or mucilage substitute

when dissolved in ether, alcohol or acetone. A special use of this cement is to anchor brush bristles to their holders.

The uses recited above are not all. The inventor goes on to state that the gum makes an excellent indelible ink for linens, that with a slight amount of solvent it may be molded into desired articles and that wood, preferably stained and made porous by heat treatment may be coated with the gum and made into furniture or other articles of manufacture.

Wide Usefulness

In view of the suggested applications of the dioxy plastics it would seem at first blush that these materials have a wider field of usefulness than even the well-known Bakelite materials. However, it must be remembered that statements contained in patent specifications must be taken with more than one grain of salt. Inventors naturally have such great faith and pride in their brain children and are so anxious to present their inventions in the most favorable light to the Patent Office as well as to anticipate and dominate the later inventions of others, that exaggerated statements often creep into the patent literature. This is especially so, since the Patent Office has no adequate means at its disposal to limit statements contained in applications for patent to results obtained in actual tests.

Physical Properties of Cellulose Plastics

(Continued from page 432)

tissue paper having a weight of about 50 grams per square meter, although cellulose is also employed. This cellulose is nitrated by treatment with a mixture of sulfuric and nitric acids. As both the sulfuric acid as well as the nitric acid exert an intumescent action upon the cellulose, the initial effect on the fiber is greater than that of the paper manufacture, the struc-

ture of the fiber being loosened. The de-acidification of the cellulose nitrate and the far-reaching grinding that follows in the hollander in order to stabilize the same, further disaggregates the fibers. Besides the merely mechanical effects, there is also a certain amount of hydrolysis or hydration.

The further disaggregation is thereupon brought about by the

peptizing or plasticizing agents. It is fact that despite all the efforts that have been brought to bear upon the problem, that camphor is still the best and most widely used cellulose nitrate colloid or plasticizing agent. From an historical standpoint this is particularly interesting as the Hyatt brothers (John Wesley Hyatt and Isiah Hyatt) are the real founders of the practical methods for the plastification of cellulose nitrate. In their U. S. Patent 91,341 they laid down the fundamental principles of pyroxylin plastic manufacture, having found the way to plasticize cellulose nitrate without the use of large amounts of solvents. This occurred under pressure.

The tough pasty mass of cellulose nitrate and camphor is then freed from undesirable impurities and from nonpeptized constituents by pressure filtration in an hydraulic press at 300 atmospheres pressure. As in this process the material is forced to pass through several layers of sieves the necessary streaming effect that is so beneficial to orientation of the individual colloid particles is initiated.

Cellulose Acetate

The cellulose acetate plastics are usually made from cotton which is first subjected to treatment with acetic acid and a little sulfuric acid so as to produce a but slightly depolymerized form of hydrocellulose. The next step in the procedure is the acetylation, which need not be described in detail as it has been the subject of countless articles and patents during the past 20 years. Cellulose acetate is a plastic product by itself, this being caused by the fact that in its manufacture it is precipitated in the form of shreds or flakes by pouring the acetylating mixture into water. However a product thus prepared has undesirable properties. It is only when plasticizing agents are added that plastic products having technical value are ob-

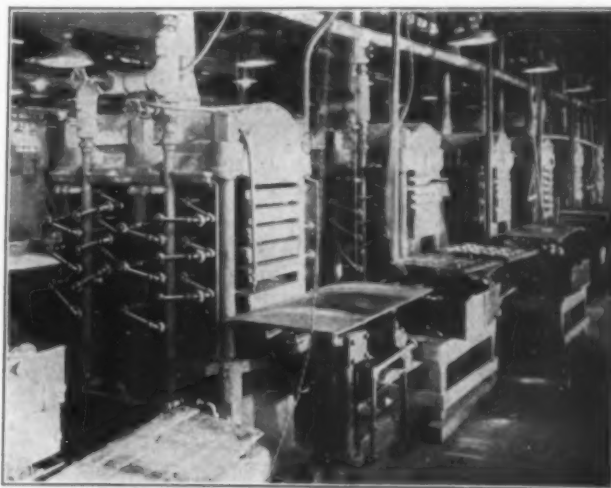
GOOD YEAR PRODUCTS

GUIDED by a manufacturing ideal expressed in the words "Protect Our Good Name," Goodyear has attained for Goodyear products such a standard of quality that to millions of users, the world over, Goodyear does mean Good Wear.

In keeping with this policy of producing only the best, Goodyear engineers go over every piece of plant equipment to the minutest detail. In their press rooms—these engineers know that behind reliable press performance must stand dependable steam line piping and for this reason have standardized on FLEXO JOINTS, requiring over 15,000 FLEXOS to equip their many and various types of hydraulic vulcanizing presses.

YOU can profit by Goodyear's experience by standardizing on FLEXO JOINTS on YOUR moulding presses.

Ask for details.



Portion of pressroom showing vulcanizing presses used for making Goodyear Wingfoot heels. All are completely equipped with FLEXO JOINTS.—Courtesy Goodyear Tire & Rubber Co. Akron, Ohio.

FLEXO
SUPPLY COMPANY
4469 MANCHESTER AVENUE
SAINT LOUIS, Mo.

~ **FLEXO** Joints ~

Essential Books

Plastics and Molded Electrical Insulation.

Emile Hemming. 313 pages. Illustrated. \$6.00.

Very special care has been taken in the preparation of the chapter on molded insulation. Contains hundreds of references to plastic and composition products and their utilization in industry.

* *

Casein and Its Industrial Applications.

Edwin Sutermeister. 296 pp. Price \$5.00. Illustrated. 1927.

Eleven authorities, many of them specialists in this field, have contributed to this volume. "Casein Plastics" is from the pen of Dr. Geo. H. Brother.

* *

The Chemistry of the Natural and Synthetic Resins.

T. Hedley Barry, Alan A. Drummond and R. S. Morrell. 196 pp. Price \$5.50. 1926.

The work of three English chemists, who are recognized authorities on this subject, one of vital interest to the Plastics Industries.

Celluloid.

Its raw material, manufacture, properties and uses.

Dr. Fr. Bockmann. 188 pages. 69 illustrations. \$3.50.

In this book, the raw product, cellulose and its properties are thoroughly described. Other raw materials and methods of rendering them more plastic also receive attention.

* *

Synthetic Resins and their Plastics.

Carleton Ellis. 514 pages, illustrated. \$8.00.

The book will serve as a guide and prove a stimulus to the numerous investigators and practitioners in the field of artificial resins. The section on plastic molding is an especially valuable feature.

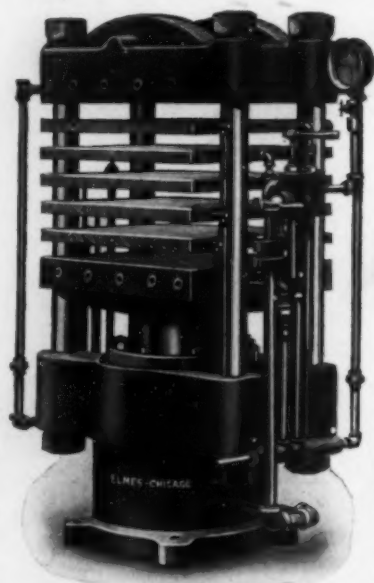
* *

Pyroxylin Enamels and Lacquers.

Samuel P. Wilson. 213 pages. Illustrated. \$3.50.

An authoritative work dealing with the materials and manufacture of pyroxylin solutions and with their application in the industry.

Write Book Dept. PLASTICS, 471 4th Ave., N. Y.



No. 2892—With Rolled Steel Plates

A popular pressing unit for

Sheet Mica, Celluloid, Rubber and Veneer

Chas. F. Elmes Engineering Works, 1002 Fulton St., Chicago, U. S. A.

E-HYDRAULIC-ELMES
PRESSES
SINCE 1851

Heat or Chill Quickly

This press is equipped with rolled steel pressing plates drilled from the solid.

These thin steel plates permit a greater number of accessible openings, eliminating the danger of leaks and are extremely sensitive to heat or cold.

Our dual pressure pump will supply one or more presses without an accumulator, where presses are operated to work alternately. A cutout device on the pump permits the operator to deliver both high and low pressure to the press at will.

We offer these presses with any number of openings and pressures to suit.

tained. Triacetin has proven to be an excellent plasticizing agent, although triphenyl phosphate and tricresyl phosphate are likewise used, the latter two also acting as a fireproofing agent. (The use of the toluene-sulfonamide compounds in recent technical cellulose acetate powders has been described in *Plastics* or various occasions during the past three years).

In order to obtain cellulose acetate products that approach the corresponding cellulose nitrate products, the various inventors, and particularly Eichengruen, have adopted methods of reaggregation that are somewhat analogous to those employed in the manufacture of casein plastics. The material is mixed with the plasticizer and is then forced through elongated passages which are provided with various interfering projections and the like in order to bring about the maximum contact of the materials and the greatest possible opportunity for orientation and alignment of the colloid particles. (See German Patents 393873; 395083; 395084; 395104; and *Revue gen. matieres Plastiques*, May 1925, p. 85).

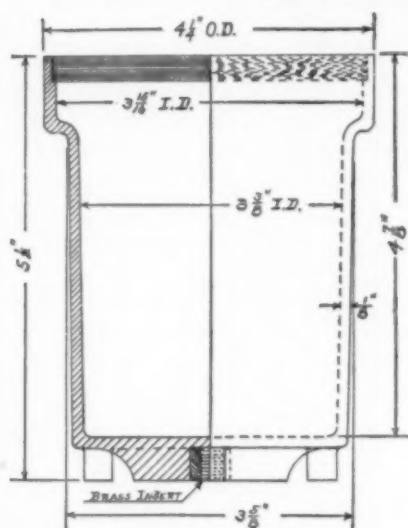
Vulcanized Fiber

Vulcanized fiber usually consists of wood pulp or cotton cellulose, preferably the latter, and is produced by subjecting paper or paper pulp to a superficial form of peptization, followed by heat and strong compression, usually on rollers. The process is often spoken of as parchmentizing. The reagents employed to bring about this effect are solutions of chlorine compounds of zinc, tin, calcium and magnesium; or sulfuric acid. These reagents produce hydrocellulose on the surface of the fiber and hence gelatinize the same, so that the pressure treatment that follows causes the material to unite into a more or less homogeneous mass. (Details can be found in H. Blücher, *Plastische Massen*, S. Hirzel, Leipzig, 1924, p. 119-124; and

For Deep Molding

Terkelsen Type E-1

It has an adjustable stroke and automatic ejection. Pressure is applied throughout stroke. Two speeds, equivalent to high and low



Piece Molded on Type E-1
Northern Industrial Chemical Co.

pressure, and automatically controlled. Pressure adjustable. Ram may be stopped and reversed at any part of the pressure stroke.



Type E-1—Model 50

Platen Area	18 1/2" x 12 1/2"
Upper Platen Adjustment	10"
Standard Stroke	12"
Motor	3 H. P.
App. Wt.	4800 lbs.

TERKELSEN MACHINE CO.

330 A STREET

BOSTON, MASS.

Halle, Kunststoffe, 1917, p. 19, 32).

The material known as *Monit* is a form of viscid, that is to say it is a modification of viscose that is obtained from the C24-cellulose xanthogenate by means of coagulation. The mechanical plastification of the initially coagulated product is effected in an extrusion press where the material is caused to pass a number of specially arranged hindrances in order to increase the plastification. (See Otto Eberhard, Austrian Patent 64-651). According to Blücher, the mechanical properties of this material are quite favorable. It forms a horn like substance.

As to the composition and technology of the plastic ma-

terial termed *Trolit* nothing has yet been published, but it is our guess that the material is produced along the lines laid down in German Patent 379299, as the mechanical properties that we have measured lead to this assumption.

The elastic behavior of the products above described will be taken up in minute detail in the next article on this subject.

Rubber Plastics

(Continued from page 443)

cupro ammonium compounds, alkali sulpho carbonates, or the like, such derivatives being used,

for example, in the manufacture of artificial silk, cellophan, zelloseglashaut.

The present invention refers to a method of producing articles in a casting mould or a pressure mould from rubber or other substances which become plastic when heated, and is characterized therein that a ready made foil or cellulose derivatives is interposed between the mold and the mass to be molded.

Preferably the foil is applied in a damp state soaked with a suitable liquid chemically indifferent to the foil, to the mold and to the molded mass. Such

Cellulose Acetate

IRVING PUTTMANN

420 LEXINGTON AVENUE, NEW YORK CITY

Phone Lexington 4646

A New Service of Immeasurable Value

We will now buy back scrap Pyroxylin from our customers completing the circle of service from the new sheet to the scrap.

Nixonoid in Sheets, Rods and Tubes

Super Pearl Essence in Lacquer, Amyl Acetate or
Solution Ready to Apply

New England Representative For

Nixon Nitration Works, Hudson Pearl Co.

PEARL ESSENCE

LACQUER COTTON

NITRO-CELLULOSE FOR LACQUER AND ARTIFICIAL LEATHER

E. W. WIGGINS

LEOMINSTER

MASS.

Complete Plant For Sale!

Perfectly equipped to produce 6600 pounds high
grade Casein Plastics per day

All modern machinery.

For details address

HEINRICH PREHN

GERMAN CORRESPONDENT OF PLASTICS

P. O. Box 58

Naumburg—Saale Germany

or Office of Plastics, 114 East 32nd St.,

New York City

liquid should not necessarily form a layer upon the surface of the film but should rather be absorbed by it.

After the removal of the interposed foil a highly glossy surface is obtained, with the details of the original minutely reproduced thereon so that no further finish is requisite.

As illustrative of the degree of exactitude obtainable by the method of my present invention, it is to be remarked that finger print impressions and gramophone records have been reproduced thereby, in vulcanized rubber, with such accuracy as has never been achieved by the known methods hitherto in use.

Shellac Like Products

Harry L. Fisher has assigned three patents to the Goodrich Company, covering shellac like soluble rubber compositions. The first of these, U. S. Patent 1,668,235, May 1, 1928, covers a process in which rubber is mixed with an organic sulfonic acid.

By mixing rubber with an organic sulfonic acid and heating the mixture, one obtains (a) products which are resilient or elastic, similar in many respects to ordinary, soft, vulcanized rubber; (b) hard, tough, heat-plastic products similar to balata and suitable for many uses similar to those of balata; or (c) hard, brittle products which soften or fuse at low temperatures and which are similar in properties to shellac, for which they may be substituted in many compositions such as those of phonograph records, molded electrical insulators, or the like.

As an example of the preparation of the elastic product, 4 to 5 parts by weight of p-toluene sulfonic acid are mixed with 100 parts by weight of crude rubber. This may be accomplished on a rubber mill or in any other suitable manner. This mixture is sheeted or otherwise formed, and is then heated for 20 to 40 hours at 120° C. The product is resilient, slightly elastic, and non-thermoplastic. When such



Accessories For Toilet Articles



**Mirrors of
the Better Kind**
for
**Fabricators
of
Celluloid
Toiletware**

We Specialize in
French Mirror Plates

Tassi Bros.
525-531 W. 24th St.
New York City

FOR SALE

UP-TO-DATE MOLDING PLANT

Highest grade equipment.

Ample Floor Space

Two Room Division

Finest Shipping Facilities

Write Box 64, PLASTICS
114 E. 32 St., N. Y. C.

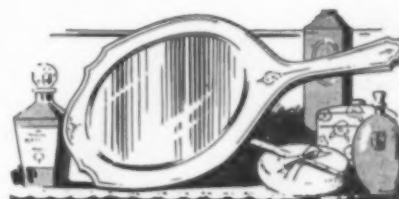
Wanted To Purchase

SYLBE & PONDORF
BLANK CUTTING MACHINE
"VERTIKAL"

Write giving full particulars.
CANADIAN BUTTONS LTD.
2091 Beaudry St.
Montreal, Can.

WANTED

A specialist who has a technical, selling or trade experience in the plastics field wishing a permanent connection with a merchandising organization as writer and lay-out man. Write giving full details as to experience, etc., Box 99, Plastics, 114 E. 32nd St., N. Y. C.



*Good
Mirrors
will guarantee
approval of
your Product*

Standard Mirror Co.
151 - 157 HARRISON STREET
Buffalo

heating is effected in air the product has a thin surface coat of oxidised material.

As an example of the tough, heat-plastic, balata-like product, 10 parts of p-toluene sulfonic acid are mixed with 100 parts of rubber. Thin slabs of the mix, preferably not more than about $\frac{1}{2}$ inch in thickness, are dusted with soapstone or other powder to prevent sticking, and heated in an oven for 48 hours at 110° C., followed by 48 hours at 120° C. Alternatively the mix may be heated in a mold or other suitable retainer to a temperature of 175° C. for 3-6 hours or at 150° C. for about 12 hours. Cooling under pressure may be employed to prevent porosity and to facilitate removal from the mold. The product

is hard and tough and somewhat similar to balata. It is thermoplastic and may be homogenized by milling on steam-heated rolls. It is necessary, for the balata-like product, that the original mix be first heated at a low temperature, preferably about 110° C., and that the slabs be prepared sufficiently thin so that the heat developed within the mass is carried off and does not cause a rise in temperature within the material substantially higher than the temperature of the oven, as such increase in temperature produces the shellac type of product as described in the following example. After the exothermic reaction has subsided, higher temperatures are used to complete the reaction and to produce the desired physical properties.

Other products and patents of Fisher and others will be described in a continuation of this article in the September issue.

Porous Articles

(Continued from page 441)

boards about $\frac{3}{8}$ " thick, the dough has puffed up sufficiently, and sufficient moisture has been driven off so that the dough sets in the expanded form and may be taken out of the mold. When making thicker products, such as bricks, a longer heating period would be required. In the production of insulating brick, furnace linings and similar thick materials, the mold may advantageously be heated to higher

PEARL ESSENCE

Super Quality Pigment
in
Paste
Lacquer
or
Solvents



Our Chemical Department Specializes in Creating
The Finest Essence

STANDARDIZED

Samples forwarded on request.

Or

Send your Articles to us and our
Chemical Dept. will produce the
required finish and formulae
for you.

Jos. H. Meyer Bros.

Manufacturers of Richelieu Pearls

220 Twenty-fifth St., Brooklyn, N. Y.

Display Offices

389 5th Ave., New York--804 Walnut St., Phila., Pa.

temperatures—even to a red heat to produce the desired material. A certain amount of the dough may push out through vent holes of the mold, but for the most part the batch remains within the mold and takes on a physical structure with an enormous number of small air cells or pockets distributed in substantially uniform manner throughout the modeled article. In cross section the finished product is not unlike in appearance the cross section of a loaf of bread.

Dimethyl Urea

(Continued from page 438)

Tenney L. Davis, of Somerville, Mass.

The inventor states that the symmetrically substituted dialkyl derivatives of urea are uniformly good solvents of cellulose nitrate, and may be used as substitutes for camphor.

Byron B. Goldsmith

(Continued from page 445)

ready described process specifically to blood or egg proteids. The same plasticizers were specified. Another specific patent, this time directed to the use of his plasticizers with gelatoids such as gelatin, was granted him June 15, 1909, No. 925328. This is practically the same as the others already mentioned.

Apparently spurred on by his researches in connection with the albumenoid plastics, Goldsmith then directed his attention to the production of plastic masses from any or all of the numerous vegetable albumenoids, such as gluten, zein, ivory nut and the legumin from peas and beans. These vegetable albumens were to be treated with the same organic plasticizing agents in the same way as with the casein. This patent issued June 8, 1909, No. 924057.

(To be continued in September)

MOLDED PRODUCTS

Devoted to the purchase, further use and merchandising of all manner of molded parts

Vol. 2

AUGUST, 1928

No. 8

Molded Gasoline Gauge

Scranton Button Company molds measuring device requiring accuracy and simplicity
---Some interesting problems solved



Fig. 3—Interior view of one half of molded gauge.

THE low temperature coefficient of expansion of shellac composition is responsible for the successful application of molding to an article that was formerly made of other materials. The manufacturers of liquid measure gauges for gasoline pumps have long been troubled with the satisfactory construction of these gauges which must combine accuracy with the feature of simplicity in operation and manufacture. This gauge is used in gasoline pumps at filling stations. In principle it is the usual mercury liquid gauge and differs from the customary types only in shape. The form finally chosen is shown in Fig. 1.

Metal Gauge

Formerly this gauge was made of metal. But while this form was accurate enough, its manufacture involved expensive

machining operations. A new material had therefore to be sought.

Celluloid Gauge

A very good design was achieved in celluloid after some trials. The gauge, it will be noted from the accompanying illustrations, consists of a system of tubing of various diameters. The celluloid gauge had the advantage that the tubing was made entirely of one piece with reinforcing plates cemented to it. But the use of celluloid introduced a new difficulty.

Expansion of Celluloid

The gasoline pumps being exposed to all weather changes, the gauge inside them undergoes considerable variations in temperature. The result was that

with these temperature variations the celluloid gauge contracted and expanded to an extent that made the device very inaccurate.

For some time the manufacturers of this device were unable to solve the problem, until experiments showed that shellac and similar compositions can very well be applied to the manufacture of this article.

Shellac Composition

The molded gauge was made in two parts, held together by screws, the bushings for which were molded into the plates. It was necessary to make the molded gauge in two pieces since the intricate tubing could not be molded otherwise. The assembled unit is shown in Fig. 1.

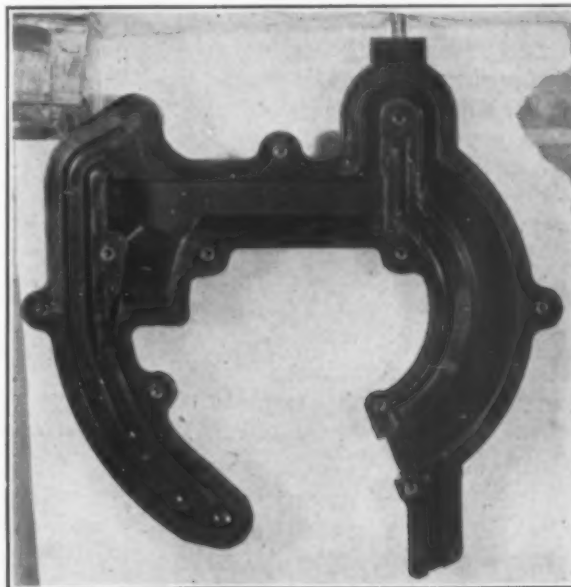


Fig. 2—Showing the channels and joint grooves of gasoline gauge.

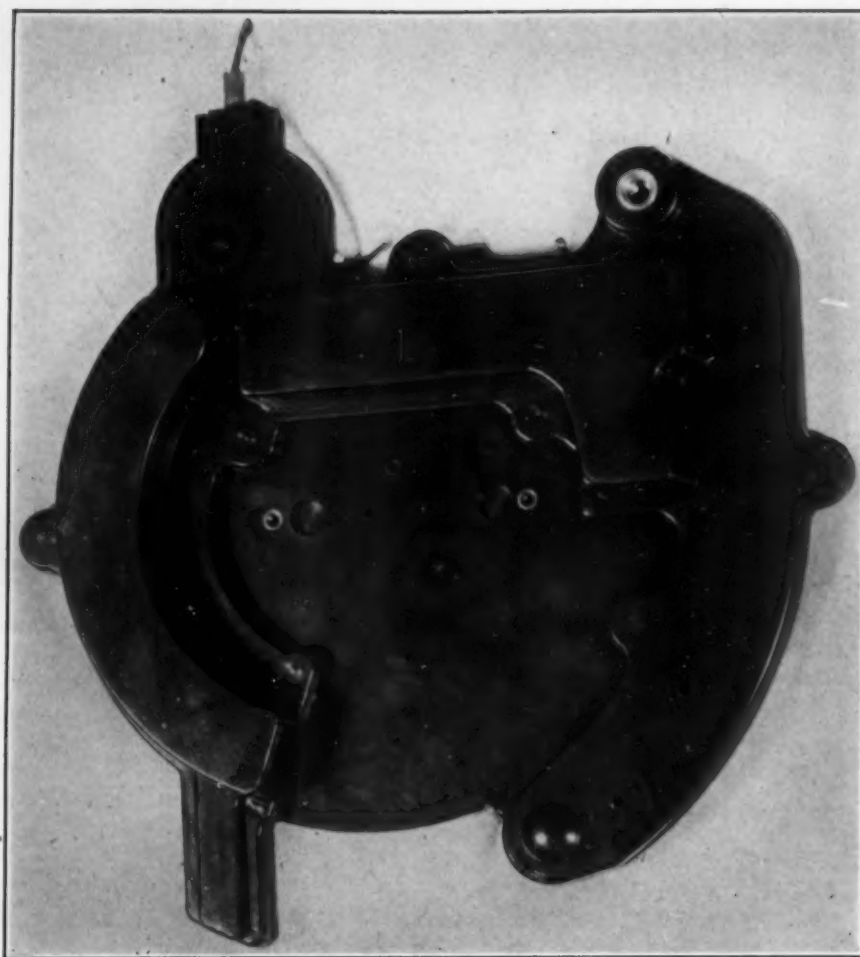


Fig. 1—View of assembled gasoline gauge molded of shellac composition.

The channels as well as the depth of the molds are better seen in Fig. 2, which shows the interior of one of the pieces in the gauge.

Making the Gauge Liquid Tight

While making the gauge of shellac composition solved the problem of expansion and contraction under the influence of temperature variations, it introduced the new problem of making the tubing liquid tight. To attempt a close enough fit between the two molded pieces was of course out of question. A gasket would have complicated the assembly and added to the expense. Some other means therefore had to be found. And it is to the credit of the ingenuity of the manufacturers that they very satisfactorily solved the problem.

It will be noticed in Fig. 2 that in addition to the main channels which form the gauge itself, there are several grooves

running parallel to these channels. At several points in these grooves holes have been drilled through the piece. After the two pieces are assembled and screwed together, a certain liquid is poured into these holes. The liquid fills the grooves to which these holes lead and causes the material opposite the grooves to swell. As a result of this swelling the material of one piece tightly fills the grooves in the other thus effecting a liquid tight joint between the two pieces.

New Electric Iron Plug Provided With Handle That Keeps Cool Throughout Use

ALL housewives have experienced the discomfort of having to pull a hot plug from the electric iron. Yet this feature has never been eliminated from that much used domestic device. There is no doubt that the new plug recently placed on the market by the Colt Patent Firearms Company will be welcome in the home and will find a very large market.

The new plug illustrated below is provided with a pivoted handle so constructed that the plug is easily withdrawn by the fore and center fingers hooked under the handle. The handle is pivoted in order to allow some play for the connecting cord which passes through it. In this way it takes the place of the customary spring wire used for this purpose. The handle is sufficiently far removed from the contact points to remain cool even when the iron has been in use for a long time.

An added feature of the new plug is that the handle mentioned above is colored. The style at present on the market is colored red but of course any color may be conveniently manufactured.

A glance at the illustration will also reveal that a new design has been introduced in the socket plug. Formerly this plug was made semispherical and offered but a poor hold, with the result that the housewife had to remove the plug by pulling on the cord. The present design is so tapered as to furnish a good grip and thus facilitate the removal of the plug.

New electric iron plug made by Colt Fire Arms Company.



Too Much Color?

What is the effect of increasing variety of color in molding on the manufacture and distribution of the products

NOWADAYS there is an increasing number of manufactured products in which color has become a pronounced factor. Automobiles, stoves, kitchen utensils, tools, hat bands, stockings,—all have a claim on the spectrum. Whether this means that we as a nation are declaring our collective and personal optimism of the "rightness of things as they are", or whether some other motive urges us to develop a sense of contrast, the fact remains that we are rivaling nature herself in the language of color.

The question has been asked recently, "Is the wide variety of shades, hues, tints and colors a repudiation of the principles of Simplified Practice, and cannot simplification be invoked to curb or at least arrest the tendency to apply color to everything?"

Simplified Practice

In answering this question it will be appropriate to first define Simplified Practice. Simplified Practice means the reduction of variety in sizes, dimensions and immaterial differences, of everyday commodities as a means of eliminating waste, decreasing costs and increasing profits and values in production, distribution and consumption.

The reader's attention is called to the word "immaterial" in the definition, and the fact that it is underscored by way of emphasis, for in that word rests the heart of the simplification movement.

Varieties in Color

Differences in color, as applied to a given commodity, is an "immaterial" or a "material" consideration according to the viewpoint from which the pro-

The increasing use of color in molded products creates an interesting economic problem which the government has long been trying to solve. The present article is a brief statement of the situation.

blem at hand is regarded. If color is considered in conjunction with articles of ornamentation, or commodities, that provide a vehicle for the expression of personality, and personal taste, then the question resolves

itself into one of aesthetics. These differences may not be vital, economically. They are important, nevertheless, and may be regarded as "material" differences.

Interchangeability

Repairs and replacements which require the harmonizing or blending of colors, create a situation which is not essentially different from that presented in the problem of interchangeability in machines. Colors must

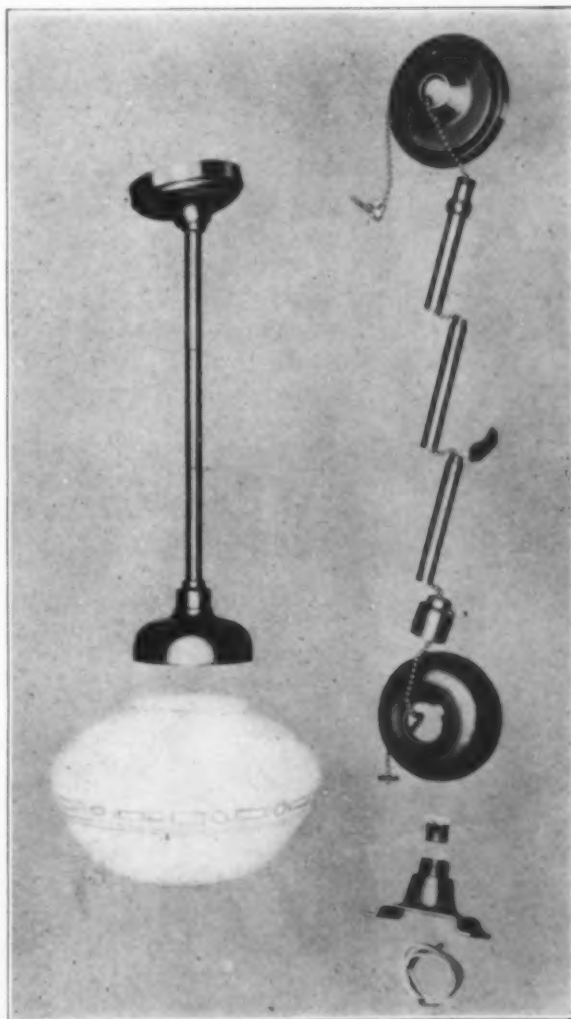


Fig. 1—This molded chandelier offers another field for the use of colored fixtures in home and office. The fixture shown here is made of bakelite and consists of seven parts.



Fig. 2—This collection of molded articles used in the home shows some of the possibilities of color variation in molded products. The articles here shown are made of bakelite.

match, harmonize with or be complements of each other; parts of a machine must "fit". Again we are faced by "material" differences.

Color and Utility

If color is regarded in connection with articles of utility, then the aesthetic side is less important while the economic side is more heavily stressed. Will a tool or any other useful commodity perform its destined function just as well while wearing one color as another? Will it perform that function less expensively if manufactured in a simplified range of colors, or with no color at all, than is the case when it is coated with color?

Assuming that color is a side issue and the question of price primary, it may be said that a clear case of "immaterial" differences is exemplified. In such circumstances simplification should offer tangible benefits to all concerned without in any way interfering with personal taste, or the expression of individuality in design and creation.

An analysis of this kind might or might not be considered practicable by an industry, in

view of other controlling factors. At any rate it will be interesting to here set down the facts that attend the production of commodities in a wide variety of colors:

Color and the Manufacturer

The manufacturer must tie up his capital in extra equipment in order to maintain production of the full line of colors. His inventory is rendered more complex and expensive, and he must have additional storage facilities. He is manufacturing for an uncertain demand and he is confronted with a variable factor of style which he never suspected would intrude itself into his business. His commodity may be a humble article of utility, but he now shares with the manufacturers of clothing, the speculative risks that go hand and hand with styles. These are all overhead costs and they eventually find their way to the consumer.

The Distributor

The distributor is faced with problems of inventory heavy investment to meet all demand, extra space, and additional rent. He adds his costs to those which have been passed on to him by the manufacturer, and again the

consumer comes into the picture.

The consumer in many instances is confused by the wide range of choice that is presented to him. Many times he desires only utility, but he pays for an ornament.

If the producers, distributors and users are of one mind in regard to the economic advantage of conforming to a simplified list of colors, it would be possible to establish such a list by the unanimous consent of all concerned. With all elements in an industry cooperating, it should be possible to arrive at conclusions that would prove mutually satisfactory.

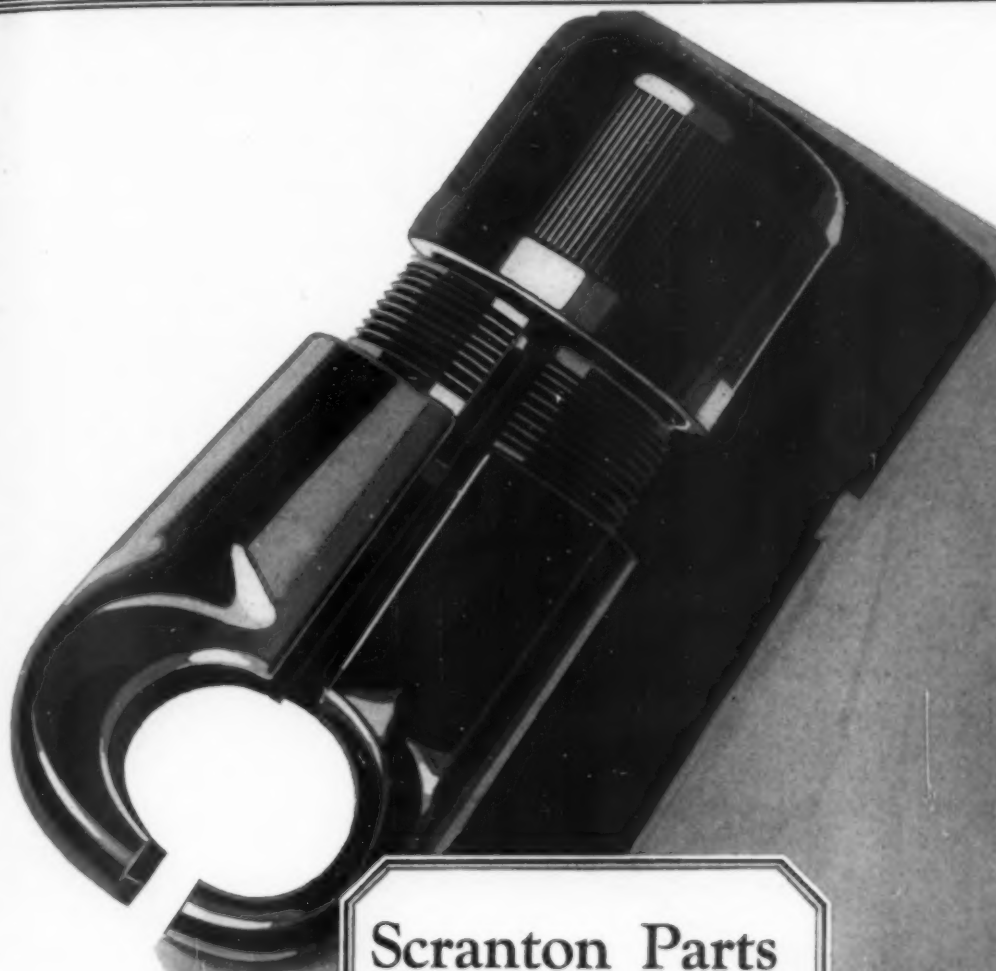
The situation may be summed up as follows:

Over-diversification is wasteful. Over-standardization stultifies and restricts.

Simplification, intelligently and moderately applied, offers a middle ground or happy medium between these two extremes.

AN interesting application of molded products was developed by the Graybar Company. Plastic molding material has been adapted to replace the usual metals in lighting fixtures. As the accompanying illustration shows, seven molded units have been fitted together to yield a very attractive chandelier rod. Among the features which distinguish this new product may be counted its adaptability to all color harmonies, its fine, highly polished finish and its excellent insulating properties. The one shown in Fig. 1, is made of bakelite.

An article
in the next issue of
PLASTICS
will discuss
some unique
molded products
manufactured by
**THE COLT PATENT
FIREARMS CO.**



Scranton Parts

Parts like the above insulator must be perfect to the hundredth part of an inch.

Here is the largest plant of its kind, Scranton turns out millions of such parts in Phenolic, Bakelite or Lacanite. Each piece must pass a test of exact thoroughness before it can leave Scranton's plant.

The Scranton Button Co.

SCRANTON, PA.

Western Representative, Gordon D. Wilson
645 Washington Boul., Chicago, Ill.

New York Office, 50 Union Square
Arthur Wiseburn, Manager

Ohio Representative, J. E. Black & Co.
The 4900 Euclid Bldg., Cleveland, Ohio

Molding Casein

Developments in the molding of finished articles of casein

By Nicholas Klein, Ch. E.

IN developing a practical method for producing casein plastic articles by a molding process, The Karolith Corporation has embarked on a project which would appear to have a revolutionary effect upon the art. Not only does the process open up new possibilities for casein plastic but it also has a distinct bearing on other plastic materials which lend themselves to molding; namely, the various synthetic resins, cellulose acetate and pyroxylin molding powders and press-masses.

No longer is casein plastic restricted to those articles which may be machined or formed from the conventional rod, tube or sheet material. Molding in a die opens up possibilities in size, configuration and surface embellishment which were heretofore impossible, at the same time retaining all the physical and chemical advantages that the original casein plastic possessed.

An article which has already been produced in marketable volume is a semi-spherical lampshade of graceful lines, molded ready to be attached to the lamp standard without any previous drilling or machining. In fact, all hand finishing operations are eliminated since the article is removed from the form perfectly polished in a beautiful three-toned mottled effect.

An example of the excellent flow and mold-filling properties of the plastic is a salt shaker molded in two parts, both top and bottom threaded in the die without any additional machining, and still yielding a perfect match when screwed together. An even more severe test of the sharpness of outline obtainable

by molding with casein plastic is a cameo made in white and coral with the features and decorative relief as clear and distinct as the most critical could demand.

As to the size of article which has already been successfully molded in casein plastic, a noteworthy example is a shade for a floor lamp. The large diameter of this lamp shade is about sixteen inches, with the other dimensions in proportion, making the article as a whole quite

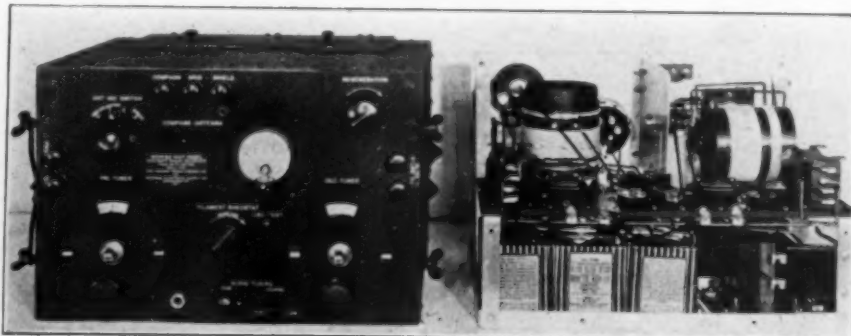
large. This particular shade is made in a solid color, with a scroll-work frieze between two rings running around the entire body of the shade. The decorative effects can be made in harmonizing or contrasting shades.

Among the other articles already molded from casein plastic are large-sized advertising letters and numerals, ladies' powder and compact cases, ash trays, covered boxes in all sizes and geometric shapes, some in very pleasing metallic effects.

The adaptability of casein molding to the production of marketable plastics is limited almost entirely by the ingenuity of the designer. There is at his disposal the entire range; opaque, translucent and clear. The complete gamut of colors, from white to black, may be

(Please turn to page 470)

Molded Equipment In The Antarctic



Receiving set used by Commander Byrd on the Transatlantic Flight of "The America".

EFFECTS of extreme cold weather over long periods of time upon radio equipment will be part of the important scientific data which the Byrd Antarctic expedition will gather at the South Pole.

In making preparation for the expedition engineers representing Commander Byrd and the Bakelite Corporation have considered the possible effects of temperatures from 50 to 75 degrees below zero upon Bakelite panels and other parts of the radio equipment to be used on the expedition constantly over a year or more in the Antarctic.

Bakelite resinoid materials ordinarily undergo no change

either in strength or in dielectric value when continuously subjected to such low temperatures. However, as a precautionary measure the Byrd expedition has been advised to use the phenol resinoid materials reinforced with special finely woven fabric base in their radio sets. A similar variety of the same material was used in the radio apparatus on the transatlantic flight of the "America".

Inasmuch as no laboratory test could compare with the actual experience in the South Pole region for months at a time, the tests made by the Byrd expedition may prove of definite scientific value.

Another new
G-E product

TEXTOLITE LAMINATED

TEXTOLITE laminated is composed of thin, non-metallic sheets impregnated with synthetic resin and compressed in powerful presses.

Millions of pounds of plate, rod, and tube have been manufactured by General Electric for its own use during the last five years.

This huge production demanded extensive facilities for manufacture, and resulted in unsurpassed technical experience.

General Electric offers these advantages to every user of high-quality laminated materials; and it further offers the unexcelled resources of its famed research laboratories and its world-wide service.



The same high quality which distinguishes G-E electric equipment is built into every piece of Textolite laminated.

Complete stocks of standard rod, tube, and plate are always on hand; and special sizes and shapes can be supplied on short notice.

Inquire at the nearest G-E office for complete information.

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

885-14

A New Departure In Molded Electric Plug Connectors

MULTIPLE outlet plugs have been manufactured in the past with considerable variation in color and in a large variety of molding materials. But almost invariably the design has remained conventional.

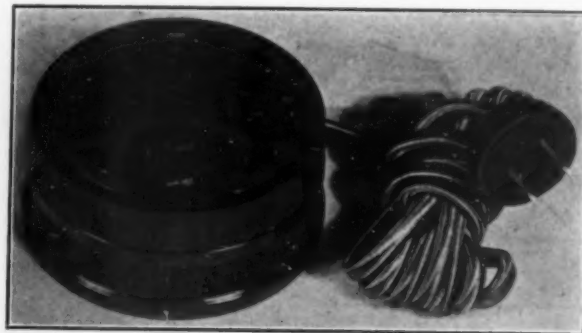
It was left to the Colt Patent Firearms Co., to produce a four way plug that embodies a radical departure in design without detracting from its color possibilities. The new plug is shown in Fig. 1. It is molded in two parts the lower one being connected by wire to the house socket outlet. The upper part plugs into the lower one and has four outlets. The advantages of this design are obvious. The four way outlet once connected to the house base plug or lamp socket may be

there has been a steadily increasing demand for it.

The molding material out of

This is an excellent example of what molders can do to open new markets by the invention of new designs. The present device is not only more attractive than others of its class but it is easier to mold as well. Undoubtedly

Fig. 1—The Colt four way plug connector.



which this article was molded by the Colt Firearms Co., was furnished by the General Plastic Inc.

the road to extension of the trade lies through such improvements as the present device represents.



Fig. 2—The new Colt four way outlet; the upper half contains the four plugs; the lower one connects direct to the house socket.

placed on the floor to serve as extension for bridge lamps, or it can be placed on the table to serve as connection for electric toasters, percolators, and table lamps.

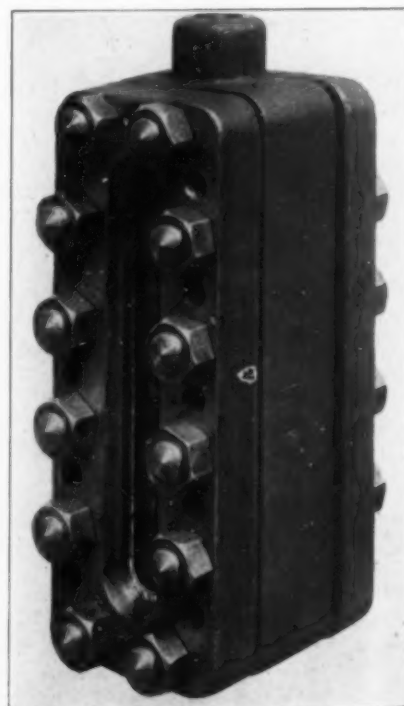
This four way outlet is at present manufactured in four colors but has unlimited possibilities in matching furniture of any color.

Fig. 2 shows the two halves of the plug separated. As will be seen, simplicity in manufacture is very ingeniously combined with attractive appearance, a feature which assures the success of the article both from the manufacturers and the consumers viewpoint. Since the article was placed on the market

Transparent Resinoid Sheet Used in Oil Gauge

TRANSSPARENT Bakelite material has been adopted for high pressure oil gauges used on pumping machinery. The construction of oil gauges normally involves the incorporation of a transparent window section within the metal housing of the gauge itself. To secure a liquid-tight gauge unit, resilient gasket material is usually placed between the metal and glass, and the assembly is clamped together through the use of retaining bolts. Frequently, the gauge glass must be of considerable thickness, in order to withstand the operating pressure of the fluid contained. When the glass has been mounted in the oil gauge, it may fracture suddenly when the combined effect of stresses, inherent and applied, has reached a critical point. Subjected to test comparison with various grades of glass made in the United States and in Germany, the Bakelite material is reported to have rated 25%

higher than glass, under application of stresses, up to the point of fracture.



High pressure oil gauge used on equipment manufactured by the Gould Pumps, Inc. Bakelite clear resinoid sheet provides a window more durable than glass.

Use Siemon Parts

BRIDGEPORT, CONN.

The Siemon Company are exclusive moulders of Shellac compositions and compositions made from other natural gums. That other compounds are replacing this old material is a misconception as evidenced by the crowded condition of our Tool Room due to dies required for new work—articles which we have never made before. Automatic equipment, modern in every way, enables us to quote prices far below any other compound.

HOOSICK FALLS, NEW YORK

The Specialty Insulation Manufacturing Company are moulders of Colasta which is useable for all purposes and is a synthetic compound that is unequaled for moulding purposes particularly on account of its uniformity and its unusual physical characteristics. The Specialty plant with their own automatic presses made in their machine shop are especially equipped to quote interesting prices on volume moulding.

WATERTOWN, CONN.

The Watertown Manufacturing Company are manufacturers of both natural gum compositions and so-called phenolic synthetic compounds. They have a spacious modern plant making a large variety of moulded articles as used for the druggists—sundries, sporting goods, smoker's outfits, automobile, electrical users, and other branches of business too numerous to mention.

This plant has also absorbed the American Composition Company which was formerly located at Newark, New Jersey.

HOOSICK FALLS, NEW YORK

The Colasta Company inventors and manufacturers of the patented and perfected moulding compound of many characteristics is daily increasing its field of usefulness.

USE SIEMON PARTS

The Siemon Family

The Siemon Company
Bridgeport, Conn.

The Watertown Manufacturing Co.
Watertown, Conn.

The Colasta Company
Hoosick Falls, New York

The American Composition Co.
Watertown, Conn.

The Specialty Insulation Mfg. Co.
Hoosick Falls, New York

Big Developments In British Phonograph Record Industry

By A. C. Blackall

British Correspondent

NO section of British industry has been so active during recent months as the phonograph record industry. It has now virtually absorbed the German record industry and is negotiating for the control of other Continental interest. Since the advent of the electrical recording process dividends have gradually crept up to very high figures indeed, and shares have changed hands on the London Stock Exchange at record prices (no pun intended). They have, in fact, competed on change with artificial silk stocks as the center of interest. In some financial circles the conclusion has been drawn from the unprecedented demand for these two types of shares that the industries have more in common than is generally believed. This is quite possible, for a company was recently floated in London with the object of manufacturing phonograph records with a cellulose base. Should these records prove the success that is anticipated other manufacturers may follow suit.

In any case, alternatives to shellac for the composition of discs are being actively sought by numerous makers. The supply of shellac is rather limited and it is too expensive for the manufacture of the cheaper classes of records. Moreover, a considerable proportion of the available production is consumed by the hat and varnish manufacturing industries. The majority of firms are testing cheaper substances, while others are considering the production of smaller records with closer recording. In one instance at least certain synthetic resins

have been used in evolving an experimental record, but these are too expensive as yet for commercial consideration. The technical activities of most of the record producers are veiled with secrecy, but a number of general facts about some of the largest of the newly-floated undertakings have been obtained

Plastics & Molded Products

will pay one cent per word for all contributions published in its pages.

Send contributions to
Plastics, 114 East 32nd St.,
New York City.

by the writer, and these are of sufficient interest to warrant publication.

In March last the flotation of Gramophone Records, Ltd., took place, with a capital of £175,000 (\$875,000). Some 3,000 shareholders were allotted shares and the issue was oversubscribed to the extent of £155,000 (\$775,000). The firm has bought a studio in London and has produced its first commercial records. The studio has been equipped with all the latest devices necessary for the art, and, with a battery of automatic presses available, it is the present policy of the firm to accumulate a large library of records and place them on the market in time for the fall trade. The company controls 28 patents and has made tentative arrangement for the records to be manufactured in Australia, where it will receive shares for its patent license and a royalty on all records produced. It was one of the first of the dozen or more

companies floated this year for the purpose of record manufacture, "but," says F. Stacey Hooker, the chairman, "in view of the epoch-making nature of our own production and its outstanding merits, we feel that we will experience no difficulty in marketing our output."

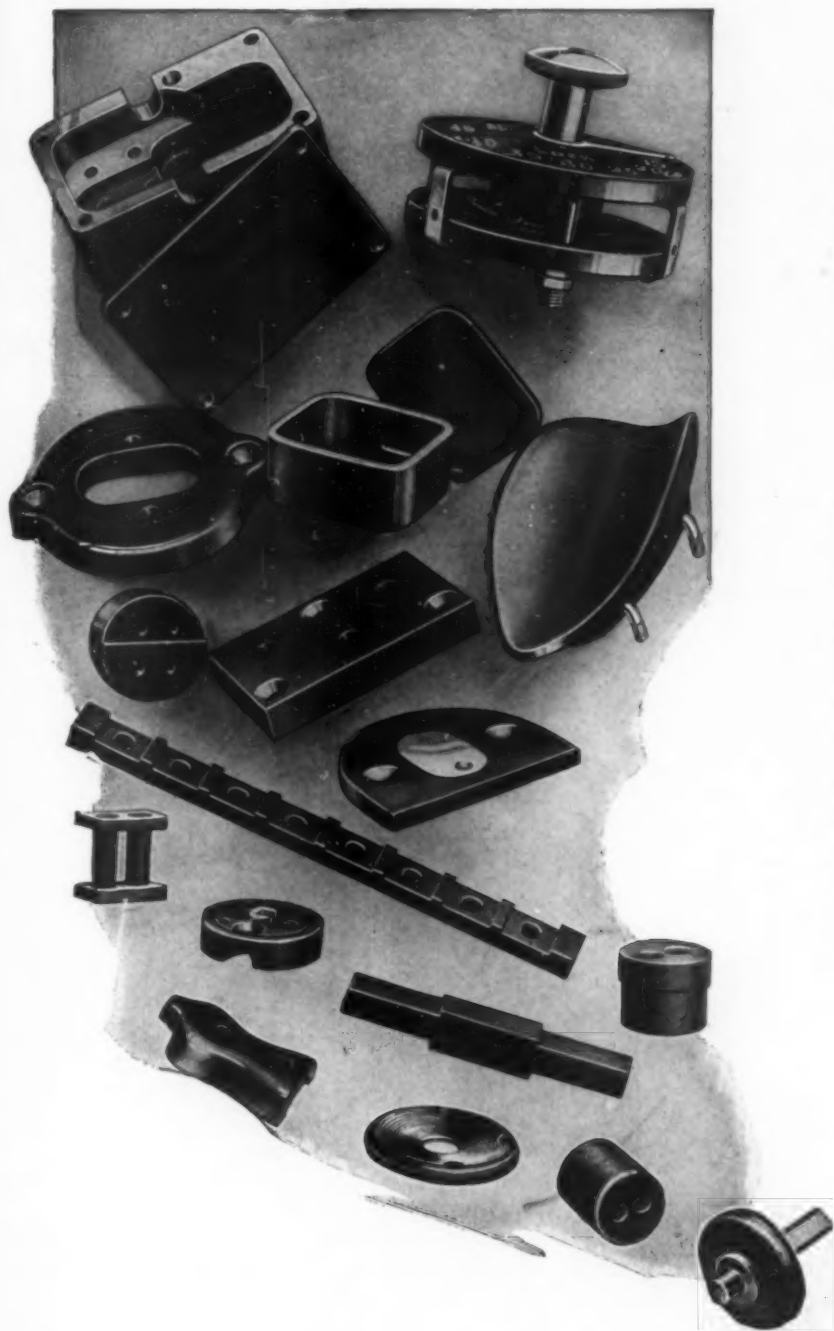
Approaches, however, have been made by friendly competitors with a view to amalgamation, and it is known that certain negotiations are taking place. Nothing, however, will be done unless the proposals are considered to be of a thoroughly sound character.

An outstanding feature of these records is their long playing time. At a recent demonstration Mr. Hooker exhibited a ten-inch record which had four songs recorded on it by Frank Titterton, the eminent tenor, and each side of the disc had a playing time of over five minutes. A twelve-inch record was also exhibited, with a playing time of about eight minutes. The composition of the records has not been made public, but it is believed that this involves no startling departure from ordinary practice.

A company formed in July for the manufacture of a thin, unbreakable record, which has, inter alia, special advantages for publicity and propaganda purposes, has a capital of £225,000 (\$1,125,000). It is known as Savoy Gramophone Records, Ltd., and is to press its records from thin sheet celluloid in accordance with the invention and process embodied in the specification of British Letters Patent No. 247,429, granted to Akira Gohara. Advantages of this record made in accordance with

(Please turn to page 466)

Parts for Many Industries



We Produce
Molded Parts
for
Over 30
Industries

To You...
We Offer
Quality and
Service
plus
35 Years'
Experience

SHAW INSULATOR CO.

IRVINGTON, NEW JERSEY

Established



1892

Molded Statuettes of Smith and Hoover



These small heads are molded of shellac composition by the Scranton Button Co. They are mounted on pins.

New Du Pont Toiletware Line

THE Du Pont Products Exhibit on the Boardwalk at Atlantic City was featuring recently, the new toilet accessories just created by the Du Pont Viscoloid Company. These constitute a revolution in the plastic toiletware business. They are made of a new material called Lucite, which because of its translucence and unusual qualities permits the reproduction, in a way hitherto impossible, of the details of styles and patterns. The articles shown in the display consist of those patterns known as the "Ming," "Empire," and "Orchis." Colors shown are Mandarin red, Colonial buff, Empire green, Napoleon blue, jet black and jade green.

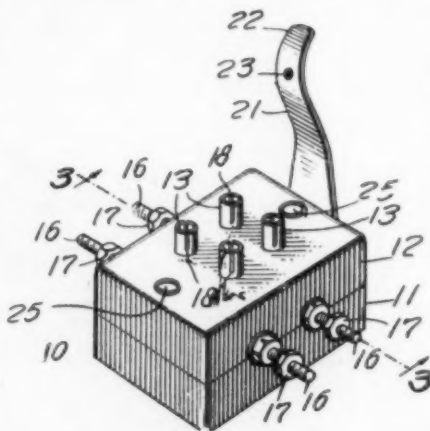
The display occupied one of the large Boardwalk windows. The brilliant coloring of the new sets was enhanced by drapes of rayon plush, chosen for their brilliant texture. These drapes were of ruby tan, jade green, peacock blue, and yellow and gold. The window was further decorated with beautiful lamps which were emblematic of the Lucite sets, a handsome metal, pagoda shaped lamp being placed in juxtaposition with the "Ming" set of toiletware, while an attractive lamp with Empire lines helped to create atmosphere for the "Empire" sets.

Thousands of people visited the Exhibit. It was announced that the Ming patterns were inspired in their decoration by vases and bowls of the ancient Ming Dynasty on view in the Metropolitan Museum of Art in

New York City. The Empire designs were specially created by an artist whose specialty is that period. The Orchis set is the work of a specialist in modern designing.

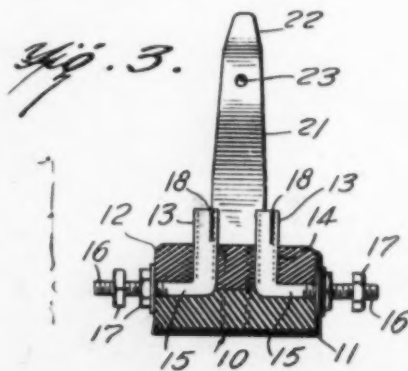
Radio Tube Base

A NEW departure for radio tube sockets offers an interesting application of molding. The mold as shown in the ac-



companying illustrations consists of two parts, with the upper half provided with four cavities.

It might be observed in passing that molders have in the past neglected to apply color to



radio equipment. It seems to us that the appearance could be considerably improved if some color variation could be introduced.

U. S. Pat. 1,671,284 issued to J. E. Hanly, Uniontown, Penna.

The Phonograph Record Industry

(Continued from page 464)

the process embodied in this patent are:—

1. In general use it is practically unbreakable, and will not crack or spoil by bending, rolling, or twisting, nor by any such means will its musical qualities be impaired.

2. It is very light in weight, five Savoy records being equal to one standard record in weight. Over 50 Savoy records can be carried in a portable phonograph compared with about 10 standard records.

3. No labels are necessary or bevelling of the edges as in ordinary records, thus saving considerable costs in production.

4. It is capable of being played hundreds of times without changing the needle.

5. It can be manufactured from non-inflammable celluloid and can be dispatched by post without risk of breakage and is capable of being rolled up and carried in the pocket.

6. The company will be able to place on the market a 10-inch double-sided record to retail at 1s. (25 cents).

7. It is suitable for distribution in connection with advertising campaigns, the surface of the entire record being capable of being printed with advertising matter, which in no way impairs the acoustic effect of the sound grooves.

8. In volume and purity of tone it is pleasing and is free from surface noise and scratch.

The directors are completing negotiations for the British rights to the matrices of the extensive catalogs of one of the largest American recording companies.

The surface of the record is suitable for printing in indel-

ible colors with designs, illustrations or, as stated, any printed matter practically indestructible. Theodore Curzon, editor of the "Sound Wave," and famous London phonograph record critic, remarks as follows on these records:—

"I am prepared to express my satisfaction as to the quality of the tonal reproduction secured on a celluloid base. It is evident to me that a new type of record has been definitely introduced, a record possessing distinctly valuable characteristics in the direction of portability, flexibility, and infrangibility. The samples submitted have been played by me innumerable times with worn needles without in any way impairing the musical quality of the recording. This musical quality is definitely good. The acoustical point of impingement is actually inside the room and not in the playing instrument."

Similar comment has been made by H. L. Wilson, author of "Music and the Gramophone."

The company is negotiating for a modern factory in Aylesbury, which it is confidently expected can be ready for the Christmas trade. It is also anticipated that a contract will be completed with a firm which possesses the necessary plant and ample facilities for extension of output to manufacture and press up to 200,000 records per month. This contract will fill the gap until such time as the company's own factory and plant is ready for production. Hydraulic plant and ten presses for the manufacture of records, with pumps and accumulators for operating same, are to be delivered to the company in about two months' time and the contractors have guaranteed to deliver ten presses each week afterwards.

It is estimated that over 8,000,000 records were sold in Britain during one month last year, and the demand is rapidly increasing. One firm recently announced that its sales of ordinary records for one month

(Please turn to page 469)



SUBSTITUTE A NORTON MOLDED PART

SUBSTITUTE a NORTON Laboratory molded part for your present stamped or cast part! Reason?

Because NORTON molded parts of Durez or Bakelite are:

1. Precise to thousandths of an inch. The last is like the first.
2. Neater and cleaner cut. Will take a higher polish and the finish is permanent.
3. They combine beauty, strength and durability.

NORTON'S completely equipped experimental laboratory coupled with a profound knowledge of "how to do it best", is your assurance of perfection in the finished product.

Our engineering department and research laboratory are yours to command. Let us send you samples and consult with you on your molding requirements.

Write, wire or phone

NORTON LABORATORIES

(Custom Molders of Durez and Bakelite)

LOCKPORT, NEW YORK

-Norloc-

NEWS OF THE INDUSTRY

Fusion of Celluloid Companies

FOLLOWING the announcement in the "World Trade" bulletin for July 23, regarding the French celluloid amalgamation, a special meeting of the above companies has been called for July 31, at which the conditions under which a fusion of these companies is to be effected will be discussed and approved. The celluloid company proposes to increase its capital from 700,000 to 1,950,000 francs, by the creation of 12,500 new shares, 9,500 of which will be exchanged against 28,500 Oyonnithe shares (the 1,500 Oyonnithe shares held by this company are to be annulled) and 3,000 for the 30,000 Petitcollin shares.

Shareholders in the Oyonnithe company will thus receive one celluloid share for 3 of the shares held by them, and the shareholders of the Petitcollin company will receive one celluloid share for 10 of their own.

As for the eventual authorization for the increase in capital of the celluloid company through the creation of cash shares, the administrative board does not intend to make use of them immediately. (Assistant Commercial Attache Daniel J. Reagan, Paris).

IT is stated that the installation of the plant and machinery at the factory of the Cellulose Acetate Silk Co. (Ltd.), at Lancaster, is well ahead of schedule time and that the company will be producing acetate of cellulose on a large scale in a few weeks.

Soy Beans in Japan

AS stated in "World Trade" bulletin for December 5, 1927, the process for manufacturing soy bean casein, while discovered some seven years ago, was just beginning to be produced. A recent letter from

Domestic Exports of Pyroxylin Products, From the United States. May, 1928

Countries	Sheets, rods or tubes		Manufactures	
	Pounds	Dollars	Pounds	Dollars
Belgium	46	35	.....	.....
Germany	1,078	1,270	591	845
Italy	11,346	12,516	19	46
Netherlands	.....	.....	8	77
Spain	25	22	.....	.....
Switzerland	.....	.....	7	109
United Kingdom	149,405	132,856	6,716	7,343
Canada	131,875	98,897	31,908	39,982
Guatemala	.....	.....	146	373
Honduras	.....	.....	13	21
Nicaragua	.....	.....	42	136
Panama	26	34	60	104
Salvador	.....	.....	34	43
Mexico	355	320	5,034	10,255
Bermudas	.....	.....	18	34
Cuba	299	340	1,230	2,014
Dom. Republic	.....	.....	217	194
Netherland W. Indies	.....	.....	16	32
Argentina	.....	.....	54	186
Brazil	75	37	43	95
Chile	17	17	.....	.....
Colombia	45	67	89	198
Peru	20	29	8	96
Venezuela	273	283	20	60
B. India	11	26	8	65
B. Malaya	.....	.....	3	11
Ceylon	35	40	.....	.....
China	.....	.....	126	162
Japan	224	325	106	121
Philippine Is.	15	23	127	198
Australia	2,364	2,039	9,321	8,506
B. Oceania	.....	.....	10	21
New Zealand	.....	.....	126	295
Union of So. Africa	480	409	312	882
Total	298,014	249,585	56,412	72,504
Shipments from				
U. S. to:				
Hawaii	18	19	1,332	1,741
Porto Rico	26	38	134	149

Commercial Attache Halleck A. Butts states that this material is now manufactured by a branch factory of the Misshin Oil Co., at No. 1 Senwaka-cho, 1-chrome, Yokohama. This plant has a monthly capacity of 5 tons of soy bean casein. The present current market price of this product is 30 sen per pound. (100 sen=1 yen=approximately \$0.46 United States currency.)

Soy bean casein in Japan is used in pattern work on both cotton and silk cloth. It is stated that the entire present output in Japan is used for this purpose. (Commercial Attache Halleck A. Butts, Tokyo).

Under date of August 16th, the following announcement has been made: "Bakelite Corporation, through their attorneys, Fish, Richardson & Neave, have filed a Bill of Complaint in the Federal Court for the Southern District of New York charging General Plastics, Inc., with infringement of patents covering improvements in the technique of manufacture of phenolic condensation products. General Plastics manufacture materials sold under the trade name "Durez". Three United States patents are alleged to be infringed—1,038,475; 1,020,593; 1,089,608."

Phonograph Records

(Continued from page 467)

only, in Britain alone, amounted to over 2,000,000; also that 2,000,000 copies of a single record had been sold. Another company has recently ordered plant to increase its production to over 20,000,000 records per annum. It is therefore estimated that with the novel features possessed by the Savoy record there should be no difficulty in reaching a yearly output of 12,000,000 records. The average net profit per record is estimated at 2d. (four cents), thus assuring a revenue of £100,000 (\$500,000) per annum. On the basis of this output the net profit would be equivalent to a distribution of over 44 per cent on total capital.

A thin, unbreakable celluloid record is also about to be manufactured by the Goodson Record Co., Ltd., which was floated some two months before the Savoy Co. The latter company, however, states that the existing known British specifications cited as material to its process have been submitted to two eminent patent attorneys and they are of opinion that the Gohara process does not infringe any subsisting valid British patent. The date of the Gohara patent (April 21, 1925) is two years earlier than that of any other material patent.

Another undertaking recently floated is known as American and Dominions Unbreakable Records, Ltd. It has a capital of £250,000 (\$1,250,000), and has been formed to acquire the patent rights for the United States, Canada, Australia, and New Zealand equivalent to the British Letters Patent held by the Duophone and Unbreakable Record Co., Ltd. (which latter recently acquired the British Brunswick Co., Ltd.), under which that company now manufactures and sells in Britain Duophone unbreakable records.

This record is double-sided, flexible, practically unbreakable and reproduces well. Surface scratches or other superficial injuries are claimed to leave



Color *that is more than* Skin Deep

Their color will wear off long before the color of a CETEC molded part. For CETEC color goes clear through. It is an integral part of the everlasting substance—can't crack, peel, stain or burn off. CETEC is now available in a wealth of beautiful colors and mottled effects. It's a better, and more economical way to meet today's demand for color.

Find Out How CETEC Molded Products Fit Into *YOUR LINE*

There are scores of ways in which CETEC is now being used. Manufacturers who investigate find new uses they never dreamed of, in many cases lowering production costs while improving their product.

CETEC is economically molded in any shape. It has a natural polish without further processing. It is heat-proof and practically fracture-proof.

The heads of this organization are pioneers in the development of the molding industry. Our resources and engineering service are unsurpassed. Our engineers are ready to co-operate with you.



CONNECTICUT

MOLDED PRODUCTS CORPORATION

MERIDEN, CONN.

BAKELITE

Molded Parts

QUALITY & QUANTITY
DEPENDABILITY

Boonton Molding Co.

324 Myrtle Avenue

Boonton, New Jersey

CUSTOM MOLDERS

Duophone records unaffected and their reproduction unimpaired. Its special construction makes it impervious to climatic conditions, thus giving it a great advantage in the tropics over the ordinary shellac record. The cost of material for the production of the Duophone records is substantially lower than that of the standard shellac record. A large proportion of compressed fiber is used in these records. By reason of their special qualities they can be safely transmitted through the post in paper wrappers without any other protective packing. They are so light that six 10-inch records can be sent under English inland postal rates for 6d. (12 cents).

The company has contracted with the Duophone Co. for the supply of a minimum of 10,000,000 records annually for a maximum period of 60 months on a cost including royalties plus 10 per cent basis. Negotiations are in progress in America which, if completed, will result in the sale by the company of the American rights either for a substantial sum in cash plus record royalties, or for shares in a company to be formed to exploit such rights there. It is considered that the demand for these records should reach at least 60,000,000 per annum in the territories mentioned. The directors have estimated for a total sale of 10,000,000 records in Canada, Australia, and New Zealand during the first year of trading, and they anticipate a profit of £100,000 on such total sale—about 2½ (5 cents) per record.

QUALITY & QUANTITY
MOLDERS

of
BAKELITE MAKALOT
and other compounds

15 Years Experience

IN

Die Designing
Manufacturing
Molding

WE
MAKE
OUR OWN
DIES

WE
MAKE
OUR OWN
MOLDS

Johnsen Molding & Tool Co.

784 Pleasant St.

E. Weymouth, Mass.

Tel. Weymouth 1503

Molding Casein

(Continued from page 460)

utilized. The casein molded article retains the odorless, tasteless, fadeless, non-conductive and non-inflammable properties that the well known stock material possesses, yet opening up a tremendous field of possibilities in the art which were impossible before this new development.

British Active in Synthetic Resin Research Field

PROGRESS in the field of synthetic resins continues actively in the United Kingdom, and at the present time considerable amount of work is being done on the utilization of acetone and aldol for synthetic resin preparation to overcome a difficulty which has been experienced in the manufacture of cellulose lacquers with some synthetic resins, on account of precipitation and blushing, with the particular solvents necessary for cellulose lacquers. Acetone forms solid condensation products with certain compounds, and as acetone is a good solvent for nitro-cellulose and is miscible with most other solvents, it is thought that this line of research will probably be productive of valuable results. While complete satisfaction has not yet been attained, the great progress made by Gardner and Krauss has spurred the British researchers on to fresh endeavors, with the result that similar important researches are being pursued in England.

British chemists have also evinced great interest in the new type of chlorinated resin that has been prepared at the American Bureau of Soils from P. cymene by chlorination in the presence of metallic catalysts. Varieties of the resin can be obtained by previously incorporating other materials with the cymene. The resins are insoluble in acids, alcohols and alkalis.

The research staffs of synthetic resin product manufacturing concerns are tirelessly engaged in the search for new products and articles suitable for manufacture from these resins.

MONSANTO Chemical Works announces the completion on August 1st of an addition to its Phthalic Anhydride Department, giving it double its former capacity.

A further increase is under way and they estimate by the end of the year their capacity will be approximately three times that of a year ago.

BAKELITE ...PLANT...

Located at Chicago Modern Equipment Used Only Several Months. Will sell entire plant or lease or rent same to responsible parties.

Equipment consists of:

- 7—20x24 Wood Hydraulic Semi Automatic Presses, Upstroke Type with push down rams, steam platens, Universal Joints.
- 3—20x24 Elmes. Hydraulic, Semi Automatic Presses, Upstroke Type with push down rams, steam platen, Universal Joints.
- 1—Elmes 6"x8' High Pressure Accumulator
- 1—Elmes 10"x12' Low Pressure Accumulator
- 1—Casey Hedges High Pressure Steam Boiler
- 1—1½x10 Worthington Triplex High Pressure Pump
- 1—3x8 Union Low Pressure Duplex Pump

Motors—Dies—Platens—Fittings — Pulverizer, Etc. All ready for immediate operation. For further information write to

Louis E. Emerman & Co.
1761 Elston Avenue
Chicago, Ill.

These Trademarks



stand for

Quality . . .
Dependability .
Accuracy . . .
and
Service . . .



For parts that are outstanding examples of custom molding; for service that insures the most exacting attention to every detail of every job.

Insulation Mfg. Co. Inc.

General Insulate Co., Inc.

New York Ave. & Herkimer St.

BROOKLYN, N. Y.

If you are in the market for molded articles, we would like to send you representative pieces of our work. Your request will receive our immediate attention.

Color in Electric Wall Plates

The present desire for colors seem to have no limit. Manufacturers in every line are investigating color. Think of stove manufacturers debating colors for gas stove knobs; undertakers selecting colors for casket interiors; pipe manufacturers using red for hot water, blue for gas, green for cold water, etc.! When we look back a few years these things seem uncreditable.

Colors are here, and the conservatives who hope to avoid them are undoubtedly going to lose some business whether they manufacture sleeping cars or alarm clocks.

Of course, intelligence or artistic sense is required in the successful use of color. Unfortunately much of the recent use of color is merely the result of those with little or no judgement of color sense merely slapping on color, whereas the successful use of it requires careful study and the judgement of experts.

In objects for household use, the manufacturer is wise who will consider the opinion of the housewife. For instance, light colors associate themselves with cleanliness and sanitation; red with danger, fire, etc; purple with royalty, and it would seem that many of the darker reds and blues could hardly be permanently accepted for some of the uses in which they are finding themselves today. Ice water would not be affected by black glass but it would lose its appeal.

The proper selection of color and color schemes must be considered scientifically. It is art and art cannot be successful when approached purely from a mercenary standpoint.

Color has come into the molding business and is making rapid strides some beautifully colored molded articles particularly in the art and novelty line have been developed.

The electric wall plate in metal confined almost entirely to

**M
O
U
L
D
E
R
S
O
F
P
L
A
S
T
I
C
S**

KUHN & JACOB
MACHINE & TOOL CO.
TRENTON ~ ~ ~ N.J.



brass and the molded plate confined to brown has never enthused the interior decorator and architect and we find that they invariably paint over them, as their feeling toward this very necessary article is that it should be inconspicuous.

The research departments of some of the molding compounds have as a result of their studies, brought out several wall plate combinations in wood effects as well as grays and greens. These colors are made to harmonize with other interior trims, all of which are meeting the general acceptance of builders, architects and interior decorators as sufficiently desirable that they prefer not to hide them by painting as was the case with the old style plate. These molded plates are being recognized as harmonious and sufficiently inconspicuous utility pieces to be used as molded.

"It is not color that we want" said a prominent architect, "but a harmonizing color that avoids clashing with other objects and tends toward inconspicuousness against the background of the wall treatment."

A RECENT announcement by the Monsanto Chemical Works states they are now equipped to manufacture on a large scale a series of plasticizers, which are entirely new to the American market. These new products, which are being offered under the trade name Santicizers, are three in number and their chemical compositions are—

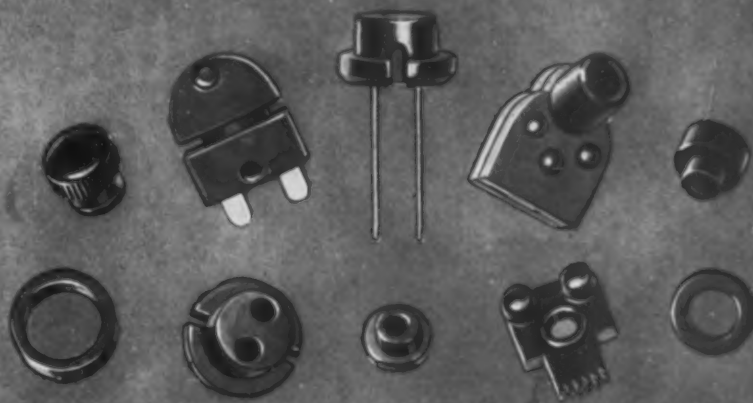
Santicizer 1—Paratoluenesulfonanilid.

Santicizer 3—Ethylparatoluenesulfonamid.

Santicizer 8—Ethylmetatoluenesulfonamid.

These Santicizers are chemically identical with products which are being used in large volume by European manufacturers of lacquers and plastics. Their availability on the American market at a reasonable price should prove of quite some interest to American manufacturers.

Anything Molded of Bakelite



*A few interesting small parts
made by*

THE RECTO MANUFACTURING CO.

23 W. 3rd St.

Cincinnati, Ohio.

MOLDING



*Service for
Every Need*

**NOVELTIES - MECHANICAL
AND ELECTRICAL PARTS**



Northern Industrial Chemical Co.
11 Elkins St. Established 1908 Boston, Mass.

Advertisers Index

Alladdinite Co.	424	Jungmann & Co.	477
Atom Chemical Corp.	476	Karolith Corp.	422
Bakelite Corp.	421	Kuhn & Jacob Machine & Tool Co.	472
C. J. Bates & Co.	476	Evarts G. Loomis	436-7
Becker Moore	476	Jos. H. Meyer & Bros.	454
Boonton Molding	470	Monsanto Chem. Co.	475
The Burnet Co.	477	Northern Industrial Chemical Co.	473
The Burroughs Co.	426	Norton Laboratories	467
Celoron Co.	439	Henry W. Peabody	477
Celluloid Corp.	480	Peckham Mfg. Co., Newark, N. J.	476
The Colasta Co., Inc.	478	Heinrich Prehn	452
Conn. Molded Prod. Corp.	469	Irving Puttman	452
T. M. Duche & Sons	477	Recto Mfg. Co.	473
Dunning & Boschert	443	William H. Scheel	477
Du Pont Viscoloid Co.	425	Seranton Button Co.	459
Economy Ticket & Label Co.	476	Rudolph Siebert	445
Elmes Engineering Wks.	450	Shaw Insulator Co.	465
Louis E. Emerman	471	The Siemon Co.	463
Erinoid Co. of America	428	Southwark Fdry. & Mach. Co.	447
The Fiberloid Co.	435	Standard Mirror Co.	453
Flexo Supply Co.	449	Standard Tool Co.	447
France, Campbell & Darling	476	F. J. Stokes Mach. Co.	445
General Electric Co.	461	Tasai Bros.	453
General Plastics, Inc.	423	Terkelsen Machine Co.	451
Wm. S. Gray & Co.	476	E. W. Wiggins	452
Insulation Mfg. Co.	472	R. D. Wood & Co.	443
Johnson Molding & Tool Co.	470		

Say you saw it in PLASTICS

Effective as of July 31st, 1928, Plastics Publications Inc., have taken over the publication and ownership of this paper as well as the Plastics Directory, Index and Buyer's Guide, formerly published by Hoffman Publications Inc. The offices of the new Corporation are at Room 1601, 114 East 32nd Street, New York, N. Y., and all business and editorial affairs should be sent to that address. Subscribers and Advertisers will confer a favor upon the Publishers, if they will make future cheques payable either to Plastics or Plastics Publications Inc.

BUYERS' GUIDE

ACCUMULATORS

The Burroughs Co.
John I. Cavagnaro, Harrison, N. J.
The Dunning & Boschert Press Co. Inc.
Chas. F. Elmes Engineering Works
French Oil Machinery Co.

R. D. Wood
A. B. Farquhar

ALADDINITE

Aladdin Co.

BAKELITE

Bakelite Corporation

BLOOD

Jungmann & Co.

CAMPOR (Synthetic)

C. B. Peters Co.

CASEIN

Jungmann & Co.

T. M. Duche

CASEIN PLASTICS

Aladdin Co.

Karolith Corp.

Erinoid Co. of America

CATALIN

Catalin Co. of America, New York

CELORON

Celoron Co.

CELLULOID

Celluloid Corp.

CELLULOSE ACETATE

American British Chemical Supplies Co.

Jos. H. Meyer Bros.

Irving Puttman, New York City

E. W. Wiggins

Monsanto Chemical Works

COLASTA

Colasta Co., Inc.

COTTON FLOCK

Peckham Mfg. Co.

CUSTOM MOULDERS

American Insulator Co.

Allen & Hills, Auburn, N. Y.

Auburn Button Co., Auburn, N. Y.

Boonton Molding Co., Boonton, N. J.

Connecticut Molded Products Corp., Meriden, Conn.

Compo-Site Co., Newark, N. J.

General Elec. Co.

Insulation Mfg. Co., Brooklyn, N. Y.

Johnson Molding & Tool Co., Weymouth, Mass.

Kuhn & Jacob, Trenton, N. J.

Northern Indus. Chem. Co., Boston, Mass.

Norton Laboratories, Lockport, N. Y.

Recto Mfg. Co., Cincinnati, Ohio

Scranton Button Co., Scranton, Pa.

Shaw Insulator Co.

Siemon Co.

DIAMONDS—INDUSTRIAL

F. F. Gilmore & Co.

DIES

Standard Tool Co.

DUREZ

General Plastics Inc.

ERINOID

Erinoid Co. of America

FIBERLOID

Fiberloid Corp.

GLASS, SILVERED

Standard Mirror Co.

Tassi Bros.

GUMS

France, Campbell & Darling

Wm. H. Scheel

HEAT REGISTERING INSTRUMENTS

Cambridge Instrument Co.

HERCULITE

The Colasta Co.

HYDRAULIC EQUIPMENT

Fred S. Carver, New York City

John I. Cavagnaro, Harrison, N. J.

Evarts G. Loomis Co.

Terkelsen Machine Co.

Burroughs Co., The

Chas. F. Elmes Engineering Works

Southwark Foundry & Mach. Co.

Dunning & Boschert Press Co.

French Oil Mill Machinery Co.

A. B. Farquhar

R. D. Wood Corp.

KAROLITH

Karolith Corp.

LABELS

Economy Ticket & Label Co.

MANICURE ARTICLES

C. J. Bates & Sons, Chester, Conn.

MEASURING MACHINES

F. J. Stokes Mach. Co.

MIRRORS

Standard Mirror Co.

Tassi Bros.

MOLDING POWDERS

Bakelite Corp.

Celoron Co.

Colasta Co., Inc.

General Plastics, Inc.

PEARL COATING

E. F. Higgins

Jos. H. Meyer Bros.

E. W. Wiggins

PHENOL RESINOIDS

Bakelite Corporation

Catalin Co. of America, New York

General Plastics Inc.

Colasta Co., Inc.

Celoron Co.

PYROXYLIN PLASTICS

Fiberloid Corp.

Celluloid Corp.

Jos. H. Meyer Bros.

Du Pont Viscoloid Co.

E. W. Wiggins

PYROXYLIN PLASTIC SCRAP

Larry Gering

ROLLING MACHINERY

Evarts G. Loomis Co.

Farrell-Birmingham Co., Inc., Ansonia, Conn.

SHELLAC

Wm. H. Scheel

Henry W. Peabody Co.

SWING JOINTS

Burroughs Co., The

Evarts G. Loomis Co.

French Oil Machinery Co.

Hydraulic Press Mfg. Co.

Flexo Supply Co.

TICKETS

Economy Ticket & Label Co.

TOOLS

Standard Tool Co.

TUMBLING

Rudolph R. Siebert

VARNISHES

Celoron Co.

VISCOLOID

Du Pont Viscoloid Co.

WOOD FLOUR

Acme Oil Co.

Becker Moore Co.

Burnett Co.

Jungmann & Co.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in PLASTICS. Please mention PLASTICS when writing to these firms.

MONSANTO



PHTHALIC ANHYDRIDE

MONSANTO

Pure Phenol is of the highest quality, especially suited to the exacting needs of resin manufacturers.

We suggest that you try Monsanto

PHENOL, U.S.P.

Pure, White Flakes that Flow from the Barrel

Advantages of the flake form—

Safety—Comfort—Convenience also a high degree of purity, as reflected in the yield of your finished product.

Manufactured by

Monsanto Chemical Works

ST. LOUIS, U.S.A.

District Sales Offices and Warehouses
NEW YORK—SAN FRANCISCO—CHICAGO

Manufacturers of more than 80 Fine, Medicinal, Technical and Intermediate Chemicals.



Materials

for the Plastic Industries



LARGEST MANUFACTURERS OF

WOOD FLOUR

IN THE WORLD

Inquiries solicited

BECKER MOORE & CO.

NO. TONAWANDA, N. Y.

Cellu-Gummed Labels

That stick to Pyroxylin
Plastics.

Also Regular Gummed and Un-
gummed Labels, printed, plain,
embossed, die cut, Cardboard
Tags, printed and blank.

**Economy Ticket &
Label Co.**

552 7th Ave., New York City

Why Not Cotton Flock ?

For Use in All Classes of Plastic Composition

*As a binder in composition products cotton with its longer
fiber is the best procurable. Why not try it?*

THE PECKHAM MFG. CO.

240 South St. Newark, N. J.

GUMS

For Moulded Composition

RESIN GUM COPAL
 COMPOUNDS

**FRANCE, CAMPBELL
& DARLING**

IMPORTERS

133-37 FRONT ST. NEW YORK

Dipping Colors—Cements
for Celluloid and Pyroxylin Plastics

Pearl Essence
Lacquers



ATOM CHEMICAL CORPORATION

96 E. 10th St., New York City

Tel. Stuyvesant 7184

Manicure Steels

for mounting in handles

Nail Files

Cuticle Knives

Shoe Hooks, Pushers, etc.

Made by

C. J. BATES & SON

CHESTER, CONN.

CASEIN

DRIED BLOOD

ARE YOU INTERESTED IN
ENTERING THE

PLASTICS FIELD

IF SO, CONSULT ME FOR
INSTALLATION, FORMULAE AND METHODS

ADDRESS H. P., CARE PLASTICS

ARTIFICIAL HORN

SYNTHETIC RESINS

Phenol U. S. P.
Formaldehyde
Denatured Alcohol
Methanol
Whiting

WM.S.GRAY & CO.

342 Madison Ave.
New York City



Materials

for the Plastics Industries



RENNET CASEIN
BLOOD ALBUMEN
Finely Powdered

Special Grades for Making
Plastics

JUNGMAUN & CO.
Incorporated
5 Desbrosses St., New York

Established 1889

The Burnet Company

292 Pearl Street, New York

Telephone
Beekman 2287

Wood Flour
Phenol U. S. P.
Formaldehyde

and other raw materials used
in the manufacture of high
grade molding compounds.

Inquiries Solicited

GUMS
and
RAW MATERIALS
For Moulders of
Composition Buttons
Electrical Radio &
Record Stock

ASPHALT—Gilsonite and Pow-
dered Asphaltum.

COMPO BLACK—

FILLERS — Aluminum Flake,
China Clay, Record Black Filler,
Talc, Etc.

GUMS—A most complete line of
every description.

MICA—Light and Dark—Vari-
ous Meshes.

WAXES — Carnauba Montan,
Stearic Acid, Stearine and Pow-
dered Wax.

Celluloid Polishes

TRIPOLI
White and Black Polishing
Compounds

WILLIAM H. SCHEEL
Importer—Manufacturer
Exporter
179 WATER ST., N. Y. C.

LABELS
BEST GUMMED LABELS

FOR PHENOL RESINS
AND PYROXYLIN
PLASTICS

ADDRESS BOX 51 PLASTICS
114 E. 32 ST., N. Y. C.

**CONSULTING
CHEMIST**

WILL SOLVE PLASTICS
PROBLEMS. FINE
KNOWLEDGE OF MANU-
FACTURING AND
FORMULAE

WRITE BOX 11, PLASTICS
114 E. 32 ST., N. Y. C.

A Special
Shellac
For each requirement

Henry W. Peabody & Co.
17 State St.
New York, N. Y.

CASEIN

ALL TYPES

T. M. DUCHÉ & SONS
376 Greenwich St.
New York City

PEARL ESSENCE

SUPERIOR QUALITY IN ALL FORMS
PASTES, LACQUERS, SOLUTIONS

MANUFACTURED BY

E. F. Higgins Laboratories, Inc.

55 Thirty-Third St.

Tel. Sunset 6890

Brooklyn, N. Y.

Uniformity in molding



UNIFORMITY determines the success of the molding process, a mass production proposition.

It means uniformity in flow point, uniformity in the properties of the finished product.

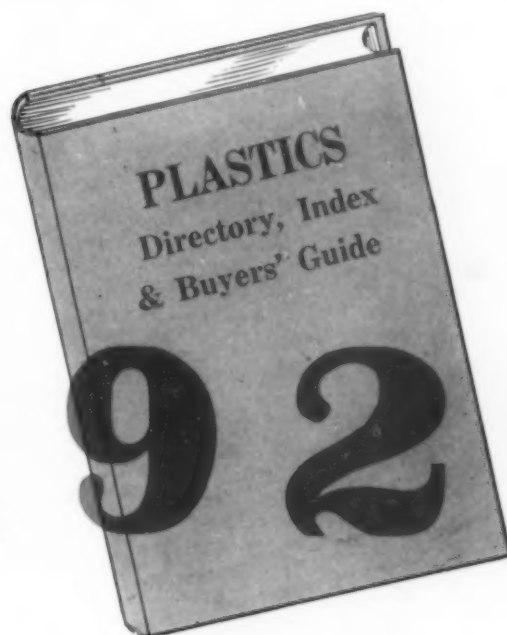
A uniform molding compound yields finished pieces up to specification, and gives all-round satisfaction.

Colasta assures uniformity

"Reg. U. S. Pat. Off." under
"Protected by U. S. Letters
Patent 1251862 and 1251863

THE COLASTA CO., Inc.
Hoosic Falls, N. Y.

First Call!



1929

COMING —!

The Plastics Directory, Index and Buyers' Guide for 1929 is already under way. It will be simpler, more accurate, much more complete and reliable. In other words, it will be *more useful!* To facilitate this, listings should be in immediately as well as applications for advertising space, and any suggestions about contents will be carefully considered.

It is your index to this field—use it! Merchandise your product to the desk of every executive in the business.

**This coupon is
ours, but it is for
your convenience.
Fill it out and re-
turn it immediately**

PLASTICS PUBLICATIONS, INC.
114 E. 32nd St., N. Y. C.

Please send me the information about

- ☐ (a) Listings.
☐ (b) Advertising rates.

For your 1929 Directory.

.....
.....
.....



"AMERITH"

The superior quality of "AMERITH" makes it the ideal material for the fabrication of innumerable articles. Your problems can easily be solved with the aid of our trained technical staff backed by fifty years of experience.

A few of the items made of "AMERITH" are: Advertising Novelties, Automobile Curtains, Brushes, Buttons, Cutlery, Guide Card, Laminated Glass, Hair Ornaments, Jewelry, Optical Frames, Toiletware, Umbrella Handles, Wood Heels and numerous other articles.

"AMERITH" in sheets, rods and tubes is truly "The Master Plastic."

"PROTECTOID"

A new plastic material made in clear transparent, opaque and mottled colors for use where a slow burning material is required.

The introduction of this material has stimulated the Lamp Shade Industry.

The variety of colors in embossed, silk and modernistic designs tends to beautify the home.

"PROTECTOID" — An innovation in the plastic field.

CELLULOID CORPORATION

290 Ferry Street, Newark, N. J.

Sales Offices: 58 West 40th St., New York City

36 South State St.
Chicago

97 Water St.
Leominster

340 Sansome St.
San Francisco

188 Morris Ave.
Providence

52 Chauncy St.
Boston